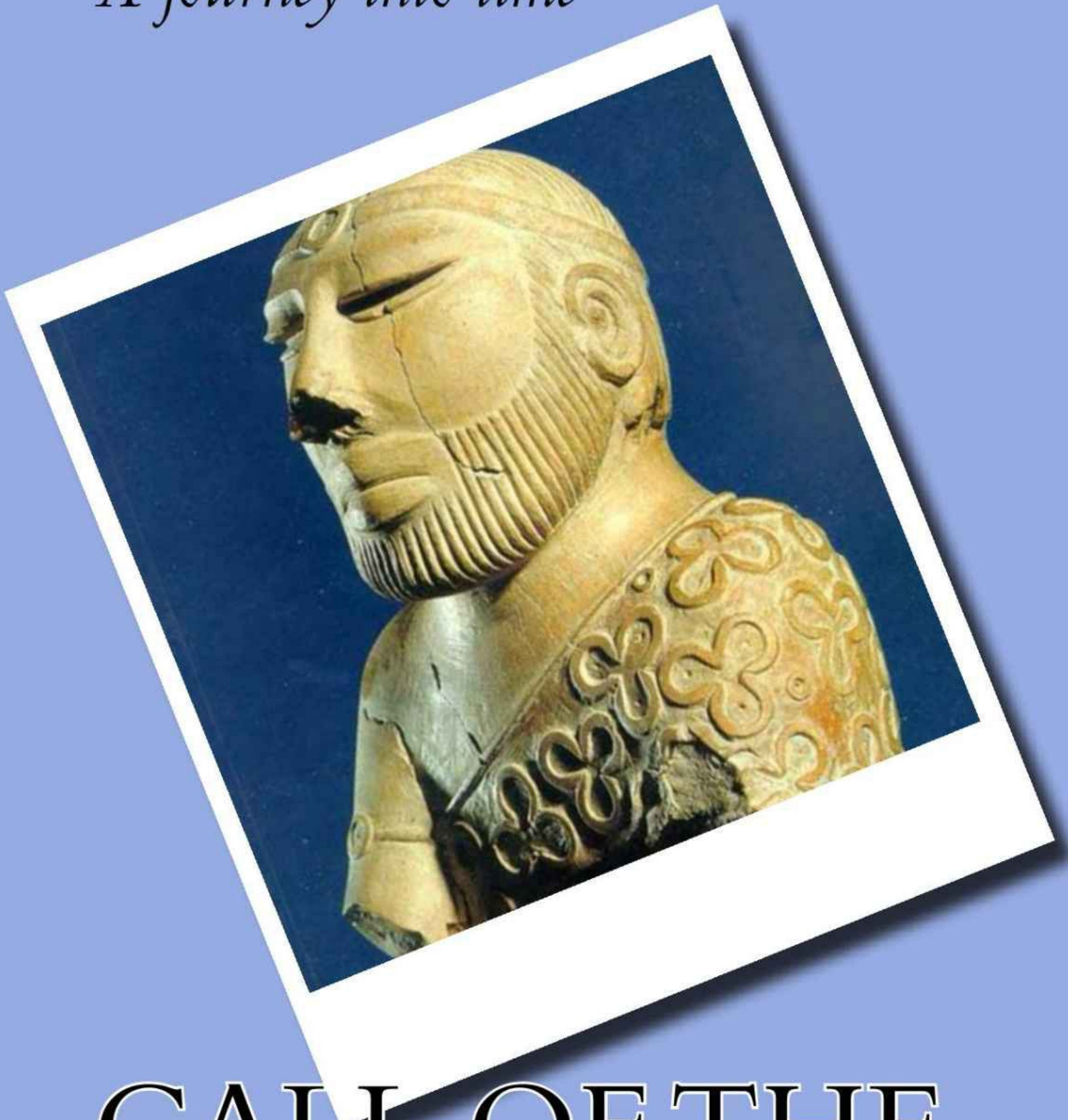
"A journey into time"



CALL OF THE LOST AGES

A Study Of The Indus Valley Script

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Call of the Lost Ages -
A Study of the Indus Valley Script

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DEDICATION

To humanity and the lost ages…

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1 FOREWORD

The history of the Indian subcontinent traces back to such a depth in time that even the modern scientific methods sometimes fail to fathom it in totality. Much of the history that we 'know' is sadly not based upon facts, figures and scientific methods, but a few convenient assumptions. Such pre-conceived notions tend to make observational history null and void by filling it with fallacies. However, the aim should be to free history of any such pre-conceived fallacies and replace them with concrete facts and figures, based solely upon neutral scientific methods and not upon the views of a few individuals or a group thereof. A region such as the Indian sub-continent, having a colonial past, must review its history in the light of neutrality and try to make its history independent of any stench of partial views of the colonial masters. Again, emphasis should be put to not blame the colonial masters overtly, or not to replace one partial view with another. That would defeat the very purpose of a scientific endeavour and fill history with new fallacies. The key is to seek truth for the sake of truth only, taking as much of an impartial stand, devoid of any emotion, as humanly possible. Such an endeavour would not place blame on others or seek revenge, but be true to its purpose of scientific inquiry. What is needed is an impartial review, nothing less than that.

With advances in scientific methods and the advent of new technology, it has become easier for us to investigate historical facts in a new light. Previously improbable ways of observations have now been made possible making use of new technologies. Such technologies have empowered us investigate history in new ways. A new review of recorded history, long overdue, has now been made possible, and the need of the hour is to do just that in an impartial way, without making any assumptions beforehand. Assumptions are a hindrance towards any endeavour seeking truth. Truth is only seen by impartial eyes, partial views and assumptions keep us from seeing truth, even the most glaring ones before our eyes. The very purpose of studying history includes learning from past mistakes not ignoring them for the sake of petty partial views. We should not be lacking in the capacity of accepting our own past mistakes, be renewed in vigour by truth itself and moving on our path of purification of mistakes. Such an expansion of scientific fervour will make history lively and vibrant, whereas any attempt to force a strangulating contraction on scientific methods will spell the death of history.

It is therefore in the interest of the dignity of any sane human being to encourage new scientific methods in investigating history and to prevent any attempts of twisting history for narrow personal gains. It is also the duty of any person, claiming sanity, to not encourage any preconceived notion as the starting point of investigating historical facts, but to accept truth as it is.

2 CIVILIZATION IN THE INDIAN SUBCONTINENT

At the beginning of the twentieth century, it was believed that civilization in the Indian subcontinent started with the people who laid down the Vedas, the Vedangas, the Upanishads, the Brahmanas and the Puranas, commonly referred to as the Vedic literature. The Vedic literature though was known to have been remembered through word of mouth down many generations before being finally written down in script. Taking into account the vast body of literature, known as the Vedic literature, it seems highly improbable and next only to impossible however, that all of it was just 'remembered' without the aid of a script of some form at the very least. This is more so because of the generally held view that the Aryans were a nomadic race arriving from outside the Indian subcontinent. How difficult is it to imagine a race of people, constantly on the move and faced with all the difficulties of arriving at some place completely unknown to them and getting their foothold there, creating such a gigantic body literature of such profoundness in such a short span of time? Is it compatible to even the very basic logic to imagine on top of it, that they remembered all of this vast philosophy, while on the move and while leading a semi-nomadic life full of hardships?

Moreover, with the discovery of a new hitherto unknown civilization (also known commonly as the Indus Valley Civilization), a very progressive one at that, complete with urban elements, makes such a possibility even more improbable. This newly discovered civilization had a very well defined way of life, as we have already learnt. It was a full-fledged civilization, with clearly defined urban-centres, the set-up and planning of which were so modern in their outlook and ways. There is no denying the fact that a very progressive and well-defined civilization was already present in the Indian subcontinent even at that time. Such a people is bound to have their own strong views and opinions about things and could not have been subjugated politically and culturally so easily by some invading race. More so when such a race had to be so busy discovering such a mammoth body of very profound thoughts and then memorizing all of it, without the aid of even a hint of a script to write it down. The 'Indus Valley Civilization' as it is known, scientifically much advanced to an invading on-the-move semi-nomadic race, would have proved far more superior to have been put down so easily

and that too without a trace.

If we go through a history of subjugation of one group of people by another, we always come across tell-tale signs of the conflicts and the ways of life that have been subjugated, even if the victors try their best to wipe out any such traces. If we take the example of even so severe subjugation as colonization of the rest of humanity by the Europeans in recent history, we find not even the most put down races of humanity failing to leave traces of their original lives, before the subjugation. This is true even after the most brutal efforts on parts of the victors to wipe out the old ways of life of the defeated people, and in many instances even the very memories of any such ways of life. Any existing group of human beings is bound to leave its imprints on the sands of time. Even the races in the Americas, even though wiped out in most parts by invading European races, have left their own distinct history for future generations to learn from. It is highly improbable therefore that such a scientifically advanced race as the 'Indus Valley Civilization' would have gone down in history without even the semblance of a trace and that too being caught up by a far less scientifically, politically and culturally advanced race.

Again, the 'Indus Valley Civilization', with its elaborate town-planning, complex social structure, system of measurements, business dealings as far as Mesopotamia (at least), could not have done without some effective language and a well-defined script. How many instances do we have of such advanced civilizations that have done without a script of some form, at least? If the two-thousand something seals, that have been discovered contains only ritualistic symbols, then are we suggesting that even these people used to memorize all their complex social and business dealings without the aid of a script of any form? Then we must be suggesting that the people in olden times had this great gift of being able to memorize anything and everything under the sun.

Moreover, a group of people migrating from one place to another are expected to talk about their original place of inhabitance, at least in the early phases of settlement. Their minds are supposed to be filled with thoughts about their original place that they had to leave. Their creations are bound to have at least a fleeting mention of their original ways of life and tell-tale signs that show the differences between the two ways of life. Any migratory culture is bound to have this tendency to try and preserve their original culture and the memories of their original place of inhabitance, rather than committing cultural suicide and forgetting even the memories of their roots. This may be otherwise only if we assume that the people in concern were really crazy in all totality. The Jewish people had to migrate so many times in the course of their history. Yet they preserve the records to this day. There is no instance of any migratory race in the world committing a cultural suicide of such sort.

The Aryans, arriving from some place outside the Indian subcontinent, must have preserved their original history and would have mentioned their original culture in their literature. However we find no such mention of a place of origin anywhere in the whole of the Vedic literature. There is not one word written anywhere in the whole of the Vedic literature about the Aryans arriving to the Indian subcontinent from anywhere outside it. What we get instead is their mentioning of the subcontinent as their holy-land and an unmistakable sense of profound patriotism regarding their holy-land. It is not wise for anybody to assume without any evidence, just for the sake of convenience and to fit in previous assumptions and narrow-based theories. Truth for the sake of truth should be the aim instead of wasting our energies in futile cultural Nazism.

The 'Indo-Aryans' themselves through their literature and philosophy do not endorse any migration from outside the subcontinent of any sort. Nowhere in the 'Vedic literature' do we find a mention of a migration from a foreign land, a mention of the ways of life of a foreign land, or a mention of a foreign culture. This should suffice as a proof of these people of not migrating to the Indian

subcontinent from Iran, Persia, and Caucasus or from anywhere else on the face of the Earth. Just to fit in some half-cooked theories and figments of imagination of colonial powers unwarranted assumptions should not be endorsed as established ones. Empowered with new scientific techniques and insights we should investigate for truth instead with as much neutrality as humanly possible.

The 'Indus Valley Civilization' is believed to have reached its peak between 2500 BCE to 1900 BCE. Taking into account the Early Harappan the Mature Harappan and the Late Harappan periods, the entire Indus Valley Civilization may be taken to have lasted from the 33rd to the 14th centuries BCE. The Localisation era of the civilization is believed to fall between 1900 BCE TO 1300 BCE. It was spread over an area of about a million square kilometres (1,260,000 square kilometres) across most of the present day Pakistan and north western India. About 1500 settlements (Kenoyer 1998) belonging to the civilization, with several large urban centres have been unearthed. Besides the seals (which are still the primary source), symbols akin to a written script have been found on objects such as pottery, ivory sticks, copper tablets, bronze implements, etc. from almost all sites of this civilization.

One point may be of interest here. Buddhism, which was the rebel child of the Vedic culture, was born as a revolt against some ill-practices that had crept Siddhartha Gautama Buddha is placed between 563 BCE and 400 BCE. Historians date the foundation of the organized or present form of Jainism to sometime between the 9th and the 6th century BCE. The Buddhists have always maintained that during the time of the Buddha, Jainism was already an ancient, deeply entrenched faith and culture. Thus we are to assume here that the Vedic culture, along with all its vast body of literature was born, flourished and decayed within a span of only a few centuries. Moreover, as Jainism must have come into being before it was organized into its present form, this period of a Vedic culture at its peak is further squeezed short.

The Cemetery H culture, as it is known to historians, developed in the northern part of the 'Indus Valley Civilization' around 1700 BCE. The regions that are found to have been predominated by this culture are scattered over present day India and Pakistan (in and around western Punjab). The Cemetery H culture is a part of the Late Harappan phase and developed in the Localization era. The Rig-Veda mentions this emerging practice mentioning that the forefathers "both cremated (*agnidagdhá-*) and un-cremated (*ánagnidagdha-*)" are invoked. Remains of the said culture are dated to a time between 1900 BCE and 1300 BCE, both inclusive. The archaeologist Kenoyer notes that this culture, showing "clear biological affinities", "may only reflect a change in the focus of settlement organization from that which was the pattern of the earlier Harappan phase and not cultural discontinuity, urban decay, invading aliens, or site abandonment, all of which have been suggested in the past." This phase of the 'Indus Valley Civilization' is marked with an expansion of settlements to the east (a sign of migration due to some problems faced in the older settlement?). The cremated remains include bones, stored in painted pottery burial urns. Rice is found to become a main crop during this period. Mud-bricks continue to be used as the building material. Different surface-treatments than earlier periods are found on the characteristic reddish pottery of this period. In the earlier periods, dead remains are found to be buried in wooden coffins. But during
This period, the urn burials are a completely different development. The 'grave skeletons' and the 'urn burials' are however found to be nearly contemporaneous.

A.Parpola (1993: 54), states that the Gandhara grave culture is "by no means identical with the Bronze Age Culture of Bactria and Margiana". The Gandhara grave culture people are seen to share biological affinities with the population of Neolithic Mehrgarh, which suggests a "biological continuum" between the ancient populations of Timargarha and Mehrgarh. All these point not towards

a migratory culture sweeping away a well established and much more advanced civilization but a continuation and gradual evolution of one civilization. The Gandhara grave culture emerged around ca. 1600 BC in areas lying in modern day Pakistan and Afghanistan ca. 1500 BCE to 500 BCE. Tulsa (1977: 690-692) argues that this culture and its "new contributions" are "nevertheless in line with the cultural traditions of the previous period", and states that "to attribute a historical value to ... the slender links with northwestern Iran and northern Afghanistan ... is a mistake", because "it could well be the spread of particular objects and, as such, objects that could circulate more easily quite apart from any real contacts." Antonini (1973), Stacul and other scholars argue that this culture is not related with the Beshkent culture of Kyrgyzstan and Vakhsh culture of Tajikistan (Bryant 2001).

The ancient treatise in the Indian subcontinent mentions ‘Aryan’ to denote ‘dignity and nobility’ pointing towards the civilized and semi-civilized races inside and outside the subcontinent. ‘Brahmin’, ‘Kshatriya’, ‘Vaisya’ are the clans inside the subcontinent. The clans and races outside the Indian subcontinent include ‘Hun’, ‘Chin’, ‘Darad’, ‘Panahb’, ‘Yavan’, and ‘Khosh’. The Huns (different from the later Huns) ruled over the north-western parts of the subcontinent. Chin (not Chinese, who did not call themselves that in those times, and gave themselves the name much later) used to live north-east of present day Kashmir. A few of the offshoots of the Chin are still existent. The might of the Darad rulers find its mention in ‘Rajtarangini’ (a treatise on the history of Kashmir, compiled by Kalhan, son of Champaka, who was a minister to Harsha, the ruler of Kashmir) in 1070 Sakabda. The Darads used to live in the hilly regions between present day Pakistan and Afghanistan. ‘Dardistan’ is still existent. Pahnabs were the ancient Persians, whose language was ‘Pahlavi’. Yavan was referred to the ancient Greeks (‘Ionia’ was a place inside Greece.). Asoka’s edicts mention ‘Yona’ or the Yeans. Ancient Egyptians and Babylonians too used to call the Greeks Yeans. The semi-civilized Aryan clans, living mostly in mountains were referred to as ‘Khosh’. The same word is used even today in the Himalayas, with unaltered meaning. The new findings on the state of 'Brahmavarta', at the junction of Saraswati and Drishadwati rivers and abode of Vedic Sages like Bhrigu and Manu, give credence to the timing of writing of Manusmriti, which mentions the flood time to be 10,000 years ago. The present day Europeans are offspring of the Khosh. All semi-civilized Aryan clans used to be depicted by this name.

Similarities in artifacts, including pottery, figurines, Seals and ornaments during times preceding the Gandhara grave culture point towards intensive trade dealings between the Indian subcontinent, the Iranian plateau and Central Asia. The artifacts are found primarily in graves. Horse remains were found in at least one burial. Horses could have been brought into the Indian subcontinent as part of such business dealings with places having easy availability of horses. Horses can be had even from invading and defeated tribes. It has always been common to trade in horses, elephants, etc., in matters of truce after the end of a war, in the Indian subcontinent. Then these could have been interbred with existing varieties or simply bred and looked after as assets and thereby a formidable number of them. Such examples abound even in agriculture.

In some sites, the Painted Grey Ware (PGW) pottery and Late Harappan pottery are found to be contemporaneous. The PWG culture in the Indian subcontinent is vastly different from the pottery from Afghanistan and the Iranian plateau. Chakrabarti (1968) and other scholars are of the opinion that the subsistence patterns and most other characteristics of the Painted Grey Ware culture originated in eastern India (Southeast Asia). According to archeologist Jim Shaffer (1984:84-85), “at present, the archaeological record indicates no cultural discontinuities separating Painted Grey Ware from the indigenous protohistoric culture.". The PWG is believed to belong to the Iron Ages, lasting between 1200 BCE and 1600 BCE. Even the Northern Black Polished Ware culture (NBPW/NBP)

shows many similarities with the 'Indus Valley' cultures. Both the cultures use a similar system of weights, systematic evolution of hydraulic features and crafts. Both cultures use similar combs and ivory- dice, use mud, baked bricks and stone for buildings, construct large architectural units meant for public use, etc. The NBPW succeeded the PWG and spanned between 700 BCE and 200 BCE. It peaked between 500 BCE and 300 BCE. In the southern part of the Indian subcontinent, the earliest Iron Age sites are found in Hallur (present day Karnataka) and Adichanallur (present day Tamil Nadu) dating back to around 1000 BC. Technical studies on materials dated c. 1000 BCE at Komaranhalli reveals that the people could already deal with large artifacts. This in turn implies that they had already been experimenting for centuries. Scholars are aware of the presence of iron in Chalcolithic deposits at Ahar. Iron-smelting in the Indian subcontinent started between 1700 BCE and 1400 BCE, this, while most of the 'Vedic Age' falls between 1300 BCE and 700 BCE. Most of the Rig-Veda has been dated even further back.

All these point towards a continuation of civilization and its gradual evolution in the Indian subcontinent. These do not in any way whatsoever establish that the Aryans came from anywhere outside of the subcontinent and invaded the aboriginal tribes. South Indian 'Dravidians' find no mention as non-Aryans anywhere and many such 'Dravidians' belonging to the 'invaded' southern India find reference in so many places as Vedic-sages, on the contrary.

There is no mention of the so-called invading Aryans trying to alienate themselves from the Dravidian races, which are themselves so rich in culture and perhaps even more ancient. The very powerful Vaishnav sect in Hinduism owes its founding allegiance to Southern seers, who are held with the highest reverence by the Hindus. Just the cultural prejudices of a few people should never be given preference over neutral scientific inquiry and the opinions of a few people with theories motivated by cultural Nazism should not be taken to be the truth. This is not only for the good and well being of the races in concern but of the original fervor of human intellect. True scientific studies reveal the inter-connections between all the various human races and how each one of them has co-existed with others and helped each other to survive and grow. The only people who can think that the history of humanity is just a saga of wars and subjugation, are the ones who have rotten diseased urge of colonizing the world and trample upon others' freedom.

As in the present, various cultures have been in contact with each other and transacting with each other down all ages. Not only that, they are related to each other. It is a mark of narrow-mindedness and intellectual and moral bankruptcy to believe that all the people in the past always fought like savages instead of interacting with each other fruitfully and each one striving to progress. Ignoring the 'bad' in human nature is as foolish a mistake to commit as ignoring the 'good' in it. In fact, doing the latter is even more demeaning to the human intellect. The term *'Iran'* is derived from the Old Iranian ethnical adjective *'Aryana'*. Now the word Aryana is a derivative, a cognate of the Sanskrit word 'Arya'. There is nothing that holds us from believing that neighbouring cultures, even in those times, had friendly normal human interactions instead of always holding animosity towards each other.

Recent developments with the advancement of sciences and the use of new technologies like remote sensing, radar imagery, study of sediments and pollens, radio carbon dating, etc., empower the historians to inquire for truth in newer ways. Modern studies conducted by various earth-scientists and the ISRO suggest that various regions in the Indian subcontinent, mainly the north-western parts encountered resurgent tectonic tumult in the later Holocene, between 2000 BCE and 1500 BCE. We find a drastic decline in river discharge in the Saraswati-Indus basin and abandonment of Kalibangan and downstream settlements in Cholistan and Ganganagar around 1500 BCE. Very severe earthquakes took place in Dholavira and the Kachchh regions. Rao (1996) and others date the sinking of Dwarka

around 1600 BCE. The whole of the tectonically active Aravali belt, between the foothills of Himalaya and Saurashtra was reshaped on a grand scale by tectonic tumult. The river Yamuna deviated into its present course and its terrace was uplifted around 1900 BCE. The river diverted eastwards. Sea-level fluctuations on the Gujarat coast are recorded between 3000 BCE and 2000 BCE. The river Satluj deviated westwards around 1500 BCE. The areas in and around Hastinapur-Yamuna plain were engulfed in heavy tectonic activities around 650 BCE. The Mahi valley in Gujarat was affected by earthquakes on a grand scale around 1300 BCE and 800 BCE. It seems that these regions encountered major earthquakes between the middle and late Holocene.

Triangular stone-anchors with three holes in each, similar to those found in Cyprus and Syria from 1500 BCE, are found in Bet-Dwarka. In Dholavira we find large-scale repair of fallen buildings around 2500 BCE. The east-west fault that lies close to Dholavira encountered many major earthquakes. The oldest carbonate material in the seismite (underground shaking of soft and moist sediments, due to earthquakes, gives rise to seismite) was pushed up due to earthquakes between 3000 BCE and 2000 BCE. A progressive westward shift of the river Indus has been taking place over the last 10000 years. The Makran coast uplifted at least 9 times and the Indus shifted nearly 160 kilometers during the Holocene. Combination of these two events resulted in a decrease in gradient of the Indus, with the formation of natural stream-ponds, due to the effect of stagnation of the river water. The floodplains were submerged due to this, causing the desertion of the Mohenjo-Daro regions. The slow uplift of the Aravali Ridge, that extends underground up to Hardwar at the foothills of the Himalayas caused the Upper Ganga-Yamuna block to tilt further eastwards around 6500 BCE, 3000 BCE, and 500 BCE, the last uplift coinciding with the abandonment of settlements in Kalibangan. The river Saraswati dried up around 1900 BCE.

Saline lakes and shallow depressions called ‘Playas’, spread over the arid tracts of western Rajasthan (west of the Aravali Ranges) are reminders of the tectonic turbulence that the areas in and around the Saraswati basin experienced during the last 10000 years. These saline lakes and shallows were formed when the ponded streams, formed due to major changes in the drainage patterns of the region and the drastic shifts of the streams of the rivers. The gradual uplift of faults causes the gradient of the streams to alter and thus bring about drainage-deflections sometimes. The Aravali Range is a visible part of underground hidden tectonic terrane, which extends over large parts of the north-western part of the Indian subcontinent. This underground portion is hidden by thick deposition of sediments brought down by the powerful rivers that drain the region.

The river Saraswati used to drain the region between the Indus in the west and the Ganga in the East. It formed by the confluence of the present day rivers, the Yamuna, the Satluj and the Tons and flowed southwards to meet the Arabian Sea. Ancient texts of the Indian subcontinent mention the river as ‘naditame’, meaning ‘the best river’. It, along with its major tributary the Drishadvati, had an extensive drainage basin encompassing present day Haryana, Punjab, Sind province and Rajasthan mainly. The remnants of its wide channel (6-8 kilometers wide) is now known as the Ghaggar in south-western Haryana and that of Drishadvati, the Chautang, draining the eastern uplands of Haryana. Before joining the Arabian Sea, it formed its deltaic region, what is today a marshy salt-impregnated depression called the Rann of Kachchh. It is primarily in the Saraswati basin that the ‘Indus Valley Civilization’ was located. Most of the Harappan settlements are found dotted in its erstwhile floodplains.

Remote sensing satellites show a progressive westward shift of the Saraswati-Drishadvati system. The abandoned courses of the rivers are shown by meandering dry channels, buried in the sandy expanses of the regions today. Actually, such a shift has taken place progressively over the last 1.5

million years. The ISRO satellites and LANDSAT imageries from NASA has helped immensely in retracing the lost streams of yore. The mighty river had its source beyond the Siwaliks, in the Himalayan realm of snow. The now dry channels of the Sarsuti near the Himalayas and its tributary the Markanda met downstream, what is now the Ghaggar. Himalayan rivers flowing immediately west of the Kailas-Abu-Girnar axis fed its discharge.

We know that the Indian landmass is pressing against mainland Asia along the Himalayas at 58 ± 4 mm/yr. Movements along Himalayan faults take up much of this convergence, but still a gap of 13 ± 8 mm/yr is left unaccounted for. This is compensated by northward movements along the faults in peninsular India. The north-east and south-west trending Aravali Ranges, that are linked with the Himalayas underneath the thick cover of sediments, has been pushing against the Himalayas, causing reactivation of dormant faults from time to time. The succession of sediments in the erstwhile Saraswati basin indicates a progression of tectonic movements, causing sudden and extensive changes in the drainage and sedimentation patterns. Sediments from the Himalayas are noticed in the Ghaggar basin, upstream of Kalibangan. The terminal segmentation and ponding and ponding phase of the Saraswati is indicated by clay deposits in the upper part of the succession. Movements along the faults caused successive earthquakes, land uplift and/or subsidence, and deflection and deviation of drainage patterns.

A study of the sediments shows richness in mica and severely marked deficiency in crystallized smectite clay. The sediments of the Saraswati basin also show a 6 stage succession in its formation. The river had heavy discharge prior to 40000 BCE. Between 40000 BCE and 20000 BCE, a marked decrease of discharge is noticed, with an increase in arid conditions. In the period between 20000 BCE and 11000 BCE, a 2 metres thick cover of wind-blown sand and silt is noticed. After around 11000 BCE, there was again a significant increase in discharge of the river. Between the period 5000 BCE and 3000 BCE, we find a progressive reduction in riverine sedimentation and wind activity. Finally, between 2500 BCE to 500 BCE, silting of the river channels due to formation of sand dunes and reduced seasonal flooding is noticed. Remote sensing technologies show a leftward lateral displacement of the Siwalik Hills along the active NNW-SSE fault caused the final deflection and drying up of the river. There is a change in pattern of settlements between 1900 BCE and 1300 BCE, when the people migrated from the middle reaches of the river towards more favourable places.

Tectonic activity along a NNW-SSE fault passing Paonta Sahab in the Siwaliks caused the main feeding-channel of the Saraswati, the Tons (with its Yamuna branch) to deviate southwards. The Siwalik terrace was uplifted due to tectonic disturbance after about 1700 BCE, in the later Holocene. Due to the slow uplift of the Aravali Ridge, the Yamuna has been shifting eastwards, increasing the drainage of the Ganga. The uplift of downstream blocks, due to tectonic disturbances mostly in the faults of south-western Aravali, caused the flow of channels to be blocked, resulting in segmentation and formation of lakes.

Gradient of streams was modified due to upward ground movement in the faults, causing deviation and resulting stagnation of the Saraswati. Westward shifting of the Satluj caused it to abandon the Saraswati and join the Indus system around 1500 BCE. Uplift of the Lahore-Sagodha hidden ridge caused this deviation of course. Thus the Saraswati was left to be fed only by the small streams coming down the Siwaliks. In the Indus system too there were some changes in drainage. Due to subsidence of the belt near the Sulaiman-Kirthar mountain front and the gradual uplift of the Markan coast changed the stream gradient of the Indus system, shifting it westwards, and stagnation ponding of a portion of it. This flooding of a part of the Indus basin caused the abandonment of Mohenjo-Daro. All these factors contributed in a drastic change in the lifestyle of the inhabitants of these regions. The

newly uprooted people had to settle eastwards and southwards by clearing forest cover, which is evident from the springing up of many new settlements in these parts. Extensive use of iron-implements from around 1000 BCE facilitated this. Occasional clashes with forest-dwelling tribes happened. However, these uprooted people gained newer grounds.

Bronze Age sites extend from Mehrgarh-Harappa on the west to Kayatha-Navdatoli (close to River Narmada) to Koldihwa- Khairdih-Chirand on Ganga river basin to Mahisadal – Pandu Rajar Dhibi in Jharia mines close to Mundari area and into the east extending into Burma, Indonesia, Malaysia, Laos, Cambodia, Vietnam, Nicobar islands. The southern part of the Indian subcontinent too has a large number of Bronze Age sites. As the Saraswati system changed its drainage pattern gradually and moved towards a final oblivion, the people too inhabiting its floodplains migrated gradually. The Indus system too deviating from its course added to this migration. There was pressure therefore to break newer grounds and move to greener pastures. This may have caused occasional strife and tension between the people. New settlements coming up from time to time in varied places bear testimony to this. Conflicts and wars may have taken place from time to time between the uprooted people, leaving behind their assured ways of life, and the people originally inhabiting these new pastures. Conflicts could have also taken place among the uprooted, migrating people themselves, competing with each other to gain control of these newer settlement areas. Resettlements all over the Ganga basin spring up over this period. They drastically increase in number about the time the Saraswati system is no longer sustainable. Urban economy and culture gives way to primarily agrarian rural way of life, before restoration of urbanization in the new settlements again.

It was in the floodplains of the Saraswati system that the Brahmavarta, as mentioned by the Manusmriti was located. It lay between the Saraswati and the Drishadvati. Many of the places described in the ancient books of the Indian subcontinent were situated in the Saraswati basin. The Rig-Veda mentions the river Saraswati more than 60 times. 'Saptasaindhav' comprised the Saraswati in the east, the Shatudri or Shatadru (Satluj), the Vipash (Beas), the Parushni or Iravati (Ravi), the Chandrabhaga or Asikni (Chenab), the Vitasta (Jhelum), and the Sindhu (Indus), and the Kubha (River Kabul) in the western parts. Historians are of the opinion the technology described in the Rig-Veda was predominantly related to copper and bronze and not iron. This too points towards a gradual progression of the civilization in the Indian subcontinent. The Mahabharata mentions that the Kuru clans reigned over the upper reaches of the Saraswati basin and the Yadu clans over the lower and coastal tracts. The Pandavas spent their 14 years of exile in the forests of the Saraswati basin. Arjuna travelled north to the Himalayas along the upper reaches of the Saraswati, in order to receive special training in weaponry and there he gained the favour of Lord Shiva who gifted him the 'Gandeev' bow. At the foothills of the Siwaliks, made of red shale, mudstone and sandstone lived the sages Vishwamitra and Vashishtha. The lower parts of the floodplains contained the forests of 'Kamyak' and 'Dvait', where the sanctuaries of the hermits and sages were located. During the Kurukshetra war, Sri Krishna's elder brother Balaram is seen to go on a pilgrimage along the course of the Saraswati. His trek from the coast started from the place where the river joins the Sea. Particularly the Kamyak forest is seen to be a centre of learning during the Mahabharata times, with people like the Pandavas, Sri Krishna and Satyabhama thronging it.

Freshwater is found even today in significant quantities in the Thar Desert, which is generally associated with saline ground-water. In the Jaisalmer and Bikaner districts and all over western Rajasthan, buried channels and relict valleys have been identified. There are eight such areas already marked. The freshwater reserves are in underground aquifers, related with the ancient channels. Sub-surface radar imagery shows fluvial landscape beneath the arid surface-cover. Electrical conductivity

prospecting reveals freshwater at a depth of 30-50 metres and 60-250 metres, in the Hanumangarh-Jaisalmer areas. Very negligible tritium (heavy isotope of hydrogen) content in this suggests that it has not been replenished by rain water. Fresh water has also been detected at a depth of 100 metres in the floodplain of the Hakra. The water at 30-50 metres is dated between 2000 BCE to 200 CE. The water at the depth of 60-250 metres was last discharged between 20000 BCE and 4000 BCE and at 100 metres to be between 11000 BCE and 2700 BCE. Sand advance from the south-west direction additionally contributed towards the gradual anti-clockwise shifting of the Saraswati and finally to its burial in the plains of Anupgarh. The Quaternary fluvial sedimentation of the Rajasthan region was formed by the once mighty Saraswati river system, bringing down mineral-rich deposits from the Himalayas.

Paleo-monsoon studies conducted mainly to study the variation of climate in areas around the Arabian Sea reveal that after 19000 BCE to 13000 BCE, south-west monsoon is weak, until the advent of a strong monsoon during the early Holocene monsoon maxima, around 8200 BCE to 7800 BCE. Though the south-west monsoon weakens again between 7800 BCE and 6800 BCE, up to the mid- Holocene (around 3400 BCE) monsoon was strong, with significant and ample wind strength and upwelling. However, by 900 BCE to 100 BCE widespread aridity, due to weakening south-west monsoon is noted. This coincides with a long drought that began in the Thar Desert region sometime between 1600 BCE and 100 BCE. The Lunkaransar Lake profile indicates a desiccated lake-bed after about 1500 BCE.

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3 VARIOUS OPPOSITE POINTS OF VIEW REGARDING SCRIPT

As of now, the Script related to the ancient civilization, that flourished in the Indian subcontinent, has defied a decipherment, that is beyond all doubts. In fact, in recent times, a few have expressed their doubts if the civilization even had a script at all. They are of the opinion that what appears to be a script is actually some sort of a pictorial depiction of rituals practiced by those people. However, this is highly improbable and most historians and scientists do not subscribe to such views. Recent entropic studies have pointed towards the script having a rich grammatical syntax. A doubtless universally acceptable decipherment of the script has eluded scientists and historians though.

One of the best and most efficient ways of studying the history of any civilization is to learn about the various visual aspects of it. Script is one such visual aspect, and actually it may be regarded as amongst the most important ones that a given civilization leaves behind for future researchers. We came to know about ancient civilizations, like those in Egypt, Mesopotamia, etc., much better after learning about how to read their respective scripts. Sadly, a decipherment of the script of the ancient civilizations in the Indian subcontinent has not always been possible.

Some historians are of the view that the script of the ancient civilization in the Indian subcontinent is related to old 'Dravidian' scripts. Some are of the opinion that the language may have been some version of old Tamil. However, in the previous chapter we have discussed how the 'Dravidian' and the 'Aryan' civilizations, as we know them, were contemporaneous at least from the time of the Saraswati-Indus civilization. Moreover, inscriptions written in the Brahmi script have been found all over the subcontinent, dating 1000 BCE, 700 BCE, and so on, which are contemporaneous to what is called the Late Harappan epoch. Thus a continuation of the Brahmi script is seen even in the edicts by Emperor Asoka.

There was co-existence, to say the least, between the 'Aryan' and the 'Dravidian' people. Ravana, the king of Lanka (present day Sri Lanka), is referred to not only as 'Arya' but also as 'Brahmin'. Nowhere in the whole of the literature do we find any mention of the 'Aryans' persecuting the 'Dravidians' and invading their land and culture. What we see instead is that the main characters are

very respectful of the various Sages, rulers, and common people, residing in the southern half of the subcontinent. We see a continuation of various practices related to the Saraswati-Indus civilization in later times, including use of a similar system of measurements of weights, lengths, regarding the Saraswati as sacred, etc. A few practices seem to have endured the tests of time. The remains of a woman from Tomb ME3T.21, Mehergarh, Period 1A, ca. 6500 BCE show her wearing 4 shell bangles on her left forearm and 3 on her upper left arm (burial ornaments made of shell and stone disc beads, and Turbinella Pyrum (sacred conch or 'Sankha') bangle. This and many other such practices are prevalent to this day in the subcontinent. Even the sculptures during the Buddhist period show men and women wearing many bangles in their limbs (arms and legs). We find men wearing a cloth on one shoulder, in the same way as the one we find on the statue of the 'Priest King' from the Saraswati-Indus civilization.

All scripts in the Indian subcontinent (barring a few that arrived from outside and including those of the languages in the southern part of the subcontinent) are known to be derivatives of the Brahmi. Different variants of the Brahmi script itself have been in use for quite a long time. Even the Saraswati-Indus had been in continuous use in various parts of the subcontinent until 500 BCE (even later than that in some instances), as discovered in recent archeological findings. This time is a precursor to or contemporaneous with the Buddhist period. Many signs of both the scripts are found to be similar-looking. Moreover, as we find various forms of the same symbols in the Saraswati-Indus script, it appears to be syllabic as the Brahmi. 39 symbols or their variants have been found (Kak and others) to account for around 90% of the total signs. The Brahmi has 45 signs which are mostly used.

The theories regarding the script of the Saraswati-Indus valley vary from each other. Most of these theories are, at, best speculative and most do not have solid foundations. One such theory relates it to the ancient Akkadian. However, a cuneiform seal with Akkadian inscription, showing a seafaring Meluhhan merchant (carrying an antelope or a goat) required an interpreter, Shu-ilishu, confirming that the Meluhhan's language was not Akkadian. Records of trade with Meluhha become frequent in Ur III period (2168-2062 BCE) and during the times of the Larsa dynasty (2062- 1770 BCE). Near the period of abandonment of the Saraswati-Indus settlements, the trade declines dramatically attesting to Meluhha being the Sarasvati Civilization. There is substantial agreement among scholars pointing to the civilization in the Indian subcontinent as a linguistic area. Sumerians record the regions of Dilmun, Magan, Meluhha and Bad Imin, lying to the east of their lands. Most scholars identify Dilmun with Bahrein in the Persian Gulf, Magan with the coast of Makran in Baluchistan, Meluhha with the region around the Indus and Bad Imin, which on translation means 'the land of seven high places' (probably the 'Sapta Saindhava).

Some theories even point towards the script to be a totally numeric one. Numbers must have been an important part of the lives of these people, as is evident by the precise town-planning, systems of measurement, trade transactions, building and controlling civilization over an area of at least a million square kilometers, etc. Even during the Early Harappan period, burned bricks have a standardized size of 1:2:4, considered to be most effective for bonding. Such a highly organized society, spanning over such a large area, could not have been possible without the use of mathematics. The structures that have survived speak volumes about their mathematical knowledge. Mohenjo-Daro is built on a foundation of an artificial platform, which is 12 metres high and spans 20 hectares. This foundation itself is a monumental work, requiring enormous amount of planning and precision to build it even today. Water-engineering found in the sites is unparalleled in the ancient world. However, these very arguments may be used to state that the script could not have been entirely numeric and that

it had language elements.

The people of Meluhha (or the people residing in the western part of the Indian subcontinent) had extensive trade relations with Sumeria and the language of these people was not Akkadian, as already mentioned earlier. The Manusmriti mentions two groups of languages spoken in the Indian subcontinent – the Arya Vaka (or the language of sophistication) and the Mleccha Vaka (or the common, less grammatically correct language). These two used to be the languages used in the linguistic area encompassing the whole of the Indian subcontinent. 'Meluhha' is a cognate of the word 'Mlechha'. The Rig Veda (10.53.4) mentions five classes of people residing in the Indian subcontinent – Brahmana, Kshatriya, Vaisya, Sudra and Nisada. The Mahabharata (12.59, 101-3) mentions King Vena as the progenitor of the Nisada, dwelling in the Vindya Mountains. The Matsya Purana too refers to King Vena as the progenitor of the Nisadas. The Nisada and the Meluhhans or the Mlechhas were the same people as endorsed by various literature of the Indian subcontinent.

The crux of all these discussions till now may be summarized as:

1. A civilization and social-system so advanced and spread over such a large geographical area could not have survived without a language and a script of some form.
2. Trade requires keeping of records and counting. The systems of measurements used in the civilization, complex social relations, and foreign trade relations, complex architectural constructs and sophisticated town-planning, etc., require much social interaction and adequate knowledge of numbers and sciences. These people could not have been petty barbarians thus, without any use for letters or numbers.
3. Historians accept the Indian subcontinent as a linguistic area. The language of the masses evolved here separately from the influence of foreign neighbouring civilizations.
4. The signs and symbols of the civilization have been discovered as far as Mesopotamia and Bahrein in the Persian Gulf. Similarly, seals from the Persian Gulf have been discovered from the Harappan port of Lothal.
5. Non-linguistic systems such as symbols for deities, markings on pottery, boundary stones, etc., are typically used on one type of medium. However, the same or related set of Harappan symbols have been found on as diverse media as seals, copper plates, pottery, clay tags, tablets, and even at least one wooden board from Dholavira. This diversified use of the same set of symbols is a characteristic of writing systems.

In early writing systems in Egypt and Mesopotamia, the application of the rebus principle ensured a breakthrough in the evolution of linguistic writing. Both these ancient writing systems used gradually standardized symbols and were written in regular lines following the order of sounds of the respective spoken language. The Harappan signs too are found to follow a standardized system and are found to be written in regular lines. The conditional entropy of the various sequences of the Harappan symbols is similar to linguistic writing. The Egyptians used a phoneticized writing system comprising very short texts and no complete sentences for about 600 years until 2686 BCE (the beginning of the Old Kingdom starting with the 3rd Dynasty). Mature Harappan period too is taken to have spanned for roughly the same amount of time and the surviving short sequences of symbols found

from the civilization are comparable to the early Egyptian writings in their brevity. The Harappan symbols do not occur haphazardly, but seem to follow definite rules, on the contrary. Scholars opine that they are read from right to left (unlike later Scripts found in the Indian subcontinent). Thus they possess an essential property of linguistic systems, which is directionality. Another definitive characteristic of linguistic systems that the sequences of symbols follow is linearity. The syntactic structure, exhibited by the sequence of Harappan symbols is evident both in the shorter texts as well as the longer texts. This underlying syntactic structure of the texts, including the occurrence of symbols that act as beginners and enders, equivalence classes of signs and symbols with respect to positional preference, groups of symbols that tend to hold particular positions within texts, etc. (Hunter 1934; Parpola 1994; Yadav et al. 2008a, 2008b), is another important linguistic property that is evident. These sequences of symbols from the civilization, having an underlying language, obey Zipf-Mandelbrot law. The Zipf-Mandelbrot law is a power-law distribution on ranked data and is considered a necessary condition for the presence of a language in any given sets of symbols. The Harappan scripts form a very large number of regularly repeated sequences.

Many linguistic systems, including later scripts in the Indian subcontinent, diacritical marks and ligatures above, below, within, or around symbol to modify the sound of root vowel or consonant symbol. The Harappan texts too exhibit this property and its symbols are often found to be modified by specific sets of marks similar to known diacritical marks. Multiple symbols are sometimes seen to be ligatured into single glyphs.

Looking at the evolution of scripts not only in the Indian subcontinent but all over the world, we come across a few telltale signs of their evolution. The evolution-process of each of these scripts has some basic parameters in common. In any such evolution we find that the convenience of writing a given sign is paramount and there is a gradual progress towards such a convenience. In fact, this is the main driving-force behind the evolution of signs. As the signs evolve, we find that they move towards more compactness and simplicity, in general. In the beginning, picture-signs are used to depict various objects and thoughts. Then these picture-signs evolve following the driving-force of gradual convenience and arrive at newer scripts. In order to draw a complete picture of the history of any given script we have to start right from the first stepping-stone of the script, i.e., the first picture-like signs, and look into their gradual evolution.

This is not a very easy thing to observe though as evolution of a script and its underlying language is not discrete but a continuous process. Such evolution is a very natural phenomenon that takes place continuously, even inside any given era in history. Another fallout of the evolution of a script is that as the underlying language evolves, the letters may shift positions of priority in the ‘commonly used’ list. A less used symbol may start being used more and vice versa. However, any such shifting of places is not sudden but is a progressive movement. Seldom do we find a sign suddenly losing importance or a less important sign becoming very important all of a sudden. Over a period of time, say a thousand years, the priority of symbols, signs, or letters may shift by one or two places. This is a very practical change. However, a few exceptions may also exist to the general rule. The gradual progressive evolution of scripts is a direct fall-out of logic and is true in all instances. Civilization tends to simplify and better ways of performing things as it itself evolves. This is a very practical observation in any human society. Compactness is the key.

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4 CONTINUATION OF CIVILIZATION

Civilization is a continuous process. It is never as if a given civilization suddenly sprouts out of nowhere or ends all of a sudden into oblivion. Any given phase of civilization all over human history is a result of a previous phase and its evolution. The next phase always builds upon the previous phases. Changes in the human society are gradual phenomena. Elements of a previous phase are thus always present in the next phase of civilization. This is true for human civilization anywhere in the world. The phases are always inter-connected with various underlying key features in common. Be it the Egyptian or the Roman civilization, changes are never discrete events and a later phase is always closely dependent upon a previous one. Even when discrete sudden changes seem to take place, there is always a set of key features to be found in common as undercurrents. An invading tribe may introduce some almost sudden changes into a given civilization, but the telltale underlying currents of continuity of the civilization are not to be missed.

Any invading tribe is bound to assimilate the features of the invaded civilization in various degrees similar to the invaded tribe assimilating features of the invading civilization. This is thus a both-way process. Even when the Europeans almost wiped out the civilizations in the Americas, they themselves became vastly different in social and cultural features from the European people. The aboriginal civilizations in the Americas (though almost wiped out) inserted various key features of themselves into their invaders. Let us consider one more example of a different kind of seemingly drastic change. Scientific revolution has brought huge changes all over the world since around the 16^{th}-17^{th} centuries. Looking back even a few decades or even a few years we may find the world to have been vastly different. Even a few years back, the world seemed to be so very different from today's 'Information Technology Age', for example. However, if we look a little closer, we find that that the changes are drastic only superficially. There is always an underlying connectivity between the various phases of civilization. The key features change very slowly. The superficial changes are comparatively much faster. But even these superficial changes are but very gradual and they can be studied in the light of their own telltale signs. Imprints of a previous phase of human civilization are thus never lost into oblivion. Looking locally in time, we may find changes to be drastic and discrete (and this is as true for the 18^{th} century people as for the 21^{st} century ones). However, a bigger picture

reveals the changes to be progressively gradual and reveals the underlying streams of continuity relating each phase with others.

Now if we look at the Harappan civilization, we find that in a matter of a few hundred years, all such telltale signs of continuity are said to have simply vanished. For no fathomable reason at all, such a progressive civilization is said to have vanished into thin air almost suddenly. This is a truly disturbing sign for any serious student of history. The rule of continuity that is so universal elsewhere is regarded null and void, for no reason at all, in the case of a certain civilization at a certain place in the world.

However, a certain portion of the civilization, relocating to other places and thereby continuing the civilization is a much more logical truth. This would have resulted in spreading the characteristics of the civilization even more. As mention earlier, we do not find a sudden influx of 'civilization' in the Indian subcontinent, but a continuity of similar patterns and properties of civilization, down the ages. This is in total contrast to any sudden influx of any civilization from the outside. Assimilation of foreign concepts into the continuum is one thing while a sudden annihilation of this very continuum is some other. While the former is a direct logical fall-out of any inter-mingling of civilization, the later is just a very disturbing proposition even from the point of view of logic.

Literature of the Indian subcontinent too point towards such a gradual relocation from 'Sapta Sindhu', a region practically same as the Harappan area. The Rig Veda, which describes fortified towns, also describes a society which is in parts urban, agricultural and pastoral, majorly similar to the Harappan civilization. Gradually, the Brahmanas, the Aranyakas and the Upanishads describe a gradual relocation to the once densely forested eastern regions of the Indian subcontinent. Similar elements in tradition and culture of the region down the various ages point not towards any demolition of continuity but towards assimilation and growth of newer elements into the older ones. This is true in the agricultural patterns, dresses, literature, different ways of life, cultural values, and the overall patterns of civilization found in the region across ages.

To reconstruct the history of the subcontinent, we may begin with a time around 6500 BCE or the Mehrgarh Period 1A, the Rig Veda being culminated in major parts by around 4000 BCE. A gradual relocation between various parts of the subcontinent as well as to places outside of it is rampant throughout. Two distinct agricultural developments occur in between. The first is the establishment of a farming complex based primarily on rabi (sown in winter) crops around 6000 BCE. A second revolution in agricultural patterns takes place around 2000 BCE, with the introduction of kharif (sown in summer) crops. These agricultural patterns are followed to this date throughout the subcontinent. There is a major relocation of people as the Saraswati dries up gradually, leading to a decline in the Harappan urban phase. A second phase of urbanization takes place in the Ganga-Yamuna regions around 900 BCE. Continuity in urbanization patterns, with the introduction of new developments is seen.

5 RELATED TO BRAHMI SCRIPTS

Brahmi is the oldest script in the Indian subcontinent that has been deciphered. Since James Prinsep's discovery, the other scripts in the Indian subcontinent have been proved to have been derived from the Brahmi, in some way or other. Brahmi is thus the source of all later scripts in the subcontinent. It seems to be the missing link between the scripts and writing systems before and after it. In fact, all modern scripts not only in the Indian subcontinent, but also in Sri Lanka, Tibet, south-east Asia, including the original source-scripts of Philippines and Indonesia are seen to be derivatives of the Brahmi system. As such, it is quite clear that the Brahmi had considerable influence over a large part of the world.

A writing system that had so much influence over the world could not have come into existence all of a sudden. Such a script needs considerable evolution from previous systems. Any proto-modern system of writing has followed such a logical path. Moreover, the Brahmi and its derivative scripts are a completely separate class from other writing systems. Such a system of writing, being vastly different from all other systems and yet so powerful in itself, must have needed a precursor as well as considerable time for its evolution. In any stable or even quasi-stable environment, scripts are not seen to change rapidly. In fact, they are seen to evolve very slowly over time. Take the example of the modern scripts, like the European ones. How much have they changed over a span of a few hundreds of years? The answer is 'very little'. Yes, there has been a twitch or two here and there, but apart from that, not much. One property that is seen to be considerably pronounced in all writing systems is that though the letters change their position of importance and priority of being used comparatively much faster, the letters themselves take a much longer time to change in appearance. We find various stages of evolution of appearance of the Brahmi and there must have been further previous stages of its development much before the Asoka edicts came into being. Thus, if we take the time around the erection of the Asoka edicts to be our starting point, the arrows of evolution of the Brahmi system of writing will be seen to point towards both the future as well as the past.

Having said this, we have to look for telltale signs of the evolution of the Brahmi deep into the past starting from the time of the Asoka edicts. One thing is as certain as daylight, the Brahmi and its precursor existed much before the script is found in the edicts of Asoka. It is even logically

impossible to consider that it suddenly appeared in these edicts out of nowhere. That will actually be akin to committing a suicide of logic. It is much more logical and sound, to say the least, to consider the form of the Brahmi in the edicts to be just a missing link between the past and the future ones. Any writing system is seen to have three major phases of evolution:

1. Logo-syllabic script – The signs represent complete syllables or words.
2. Syllabic script – The signs almost exclusively have syllabic values.
3. Alphabetic – The signs represent various sounds.

Each of these phases of development of scripts again has various sub-phases of evolution. Writing started with the depiction of thoughts through the use of particular symbols for commonplace more 'local' objects and living things, like bulls, cereals, urns, trees etc. At this stage, the symbols would have been too many with a number of variants for each one of them. Such symbols would have had very less universality. In the next stage, the symbols would have been modified following the rule of convenience of use and lead towards more and more universal symbols. Next stage included more emphasis on simplification of the symbols. This is the origin of further development of the rebus principle. Thus, in logo-syllabic scripts, the number of basic symbols used is much greater than in syllabic and alphabetic scripts. In such a script, word divisions are often not marked. 'Words' can however be made out from units of one, two or three signs even in long inscription, however. Any sample of ancient writing may even fall in between these stages of development. For example, in early alphabetic system, we find much less or in some instances even no use of vowels. Consonant symbols are mostly or solely used in such samples.

The next major stage of development from the use of facsimiles of actual objects is the transformation of such facsimiles into more abstract geometric signs. In this stage, the emphasis is more one the convenience of writing and signs evolve with even lesser rapidity, generally. Sudden surges in transformation of the signs are sometimes noticed, however. Starting from this phase, the writing units are also seen to keep shifting more and more in the priority list of being used. A once more often used sign may become less used with time and vice versa. Some signs may even become more or less obsolete depending upon a variety of factors like, changes in the underlying language, the rule of increasing convenience, unseen factors like a change in culture, etc. The obsolete usages or 'dead signs' are of particular importance in determining the age of a given script. Taking into account the metrics of usage of such signs we may get an estimate of its antiquity.

A phase of major simplification of signs follows the 'facsimile phase'. In this phase, most emphasis is on simplification of the signs and symbols and on the separation of more complex underlying sounds into simpler ones. As such, there is a gradual breakage of 'combination signs' (sometimes representing whole words) into new and simpler 'constituent signs', leading to stabilization of the scripts towards an alphabetic system. This phase is often the most rapid and violent amongst all phases of evolution of scripts. There is comparatively a very fast increase in changes made in the order of the script, until a final stabilized phase is achieved. Even the 'stabilized phase' keeps evolving, but this happens with a much less quantity now.

Any given original writing system must pass though these phases of evolution and therefore develop distinctive features on the way. These distinctive features act as prominent and unique fingerprints for the various writing systems in existence. Sometimes, features from other systems may

be imbibed into a given system through the process of co-existent usage. However, the original fingerprints are never completely lost in the process but co-exist themselves with the inculcated fingerprint features. It is these fingerprint features that give us the telltale signs of the origin and evolution of any given writing system. These are like street-lamps that shed light on the story of evolution of a script and enable us to find our way through the clutter of lost ages.

Whenever we are to study about the origin and evolution of any given writing system, we have to take into account its unique signature features. This is particularly necessary in the study of ancient scripts. In fact, without studying about these signature features we can never have a complete understanding of a writing system. Our study of the nature of any script must include taking into consideration all possible signature features regarding that script and other related scripts and then studying the intersection set for these features. This is an absolute necessity.

One important hurdle in the study of early writing systems, particularly the early rebus dependent scripts, is that we often have only short and very short samples of them. This makes their study markedly difficult. Also, at this stage of script development we find several variants of the same symbols and this makes them confusing for us to study them. However, this confusion too can be mitigated to a large extent if we study them in the light of their unique fingerprints. Relation between two or more scripts has to be studied in this light. The presence of the features of one writing system in the DNA of another would points towards a connection and at least a transaction of features between the two systems. When unique fingerprint features of one script are found in another script, separated in time, it points towards the former to be a precursor of the later. More the presence of these unique features in two or more writing systems, closer is the relation between them. Also, by studying such inherent features of different writing systems, we can move towards the complete family-tree of writing scripts of the world.

The Harappan inscriptions in many ways look similar to later Brahmi. Many of the symbols used in the former look similar to those used in the latter. Like the Brahmi script, the Harappan inscriptions too seem to use a lot of conjuncts of various symbols. In the Harappan inscriptions, we find, there are various forms of the same symbol, indicating towards the script being syllabic.

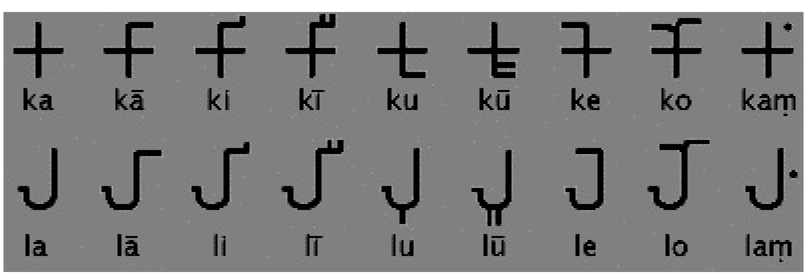


Fig. 1 : different forms of two symbols used in Brahmi.

The Harappan symbols have been found to be used in different parts of the Indian subcontinent until around 400 BCE. This bridges the gap between the late Harappan script and Early Brahmi. Brahmi was written generally from left to right. However inscriptions in Brahmi found to be written from right to left prove that writing from right to left had also been one of the traditions of the subcontinent.

In fact scholars like Basham, Kak et al. are of the opinion that Brahmi might have been written originally from right to left. Similar to the symbols in Harappan inscriptions, the Brahmi characters too had many variations over place and time. Even the most frequently occurring Harappan symbols

look uncannily identical with their Brahmi counterparts. Such a resemblance in such fundamental features cannot be expected to simply be born out of chance. The most frequently used symbols of both the scripts in fact appear even in the same order of frequencies. The most frequently used letters of both the scripts even look almost identical.

Even a logical continuity of culture, as discussed earlier, suggests a gradual transformation of the Harappan symbols into later Brahmi ones. This is a natural result of evolution of the Harappan symbols. Unlike any unnatural theory of a cultural upheaval, understanding this gradual evolution opens up newer vistas in understanding the history of the subcontinent itself. The point here is if it is possible to have a simple logical solution to a given problem, then it becomes totally unnecessary to accept a much more complex solution in its place. Scripts everywhere in the world have followed this gradual transformation and evolved from formal stages into later ones.

Sudden upheavals in the culture of writing systems have taken place from time to time and these have had their respective effects on the various scripts. However, these upheavals have never been able to take away the inherent fingerprint-characteristics of the scripts. Unless there is a complete change in the ways of life of a place, there is no instance in which a script all of a sudden loses its way in the sands of time.

In order to cope up with changing situations and demands of time, scripts everywhere have been found to evolve, preserving their fingerprint-characteristics. These fingerprints are never lost unless the script itself is completely lost. However, even then, these fingerprints are preserved and taken forward in sister and daughter scripts of the lost one. Once a given script takes birth, over time it goes on imbibing newer fingerprint-features though and thus leaves behind more and more trail marks of evolution for us to investigate.

Even the writing- materials are known to evolve over time. ‘Papyrus to paper’ is a phenomenon observed everywhere in the world. Again, right from the first scribbling on stones, bones and such material, the human history came a long way to discover materials like papyrus or finally paper to write on. However, unfortunately as the evolution took place these materials became more and more perishable. Alexander’s historians mention cloth to being used in used the Indus Valley at that time as writing material. In fact, materials like parchment, palm leaves, wood, birch bark, cotton cloth. etc., have been used traditionally in the Indian subcontinent. All these materials are not preserved very well over a long time. Though a book written on stone will be less convenient than one written on paper, yet the likeliness of the latter being preserved over a long time is much less than that of the former.

This is particularly important from the point of view of studying the evolution of script in the Indian subcontinent. Entire chapters in the process of evolution of scripts may be missing due to the specimens not being preserved well. Therefore it is particularly difficult for us to investigate all the pieces of the jigsaw puzzle of this evolution. We have to be extra careful and rely on the telltale signatures of the scripts over time.

Changes in script that preserve fingerprints of former scripts are genetically linked. Similarities that cannot arise from mere chance are also to be taken into account in this regard. When scripts share such similarities they also share a common source. Barring a few exceptional cases, the underlying languages for such scripts too are most likely to be linked. When all these telltale signs point towards a natural evolution and continuation of scripts in the Indian subcontinent, it should not be of much use to look for other alternatives that lack any concrete proof. Instead, we should channelize our efforts towards studying this evolution in a new light of proof and logic and shun any unwarranted assumption in this regard. There is no place for any such assumption in scientific investigations.

As mentioned earlier, the Harappan signs have many physical similarities with later Brahmi scripts. Many of these signs are completely preserved in appearance in the Brahmi variants. Thus the criterion on physical similarities too is fulfilled. The Harappan script was written from right to left unlike the Brahmi, which was written from left to right. However, instances of the Brahmi being written from right to left point towards these two scripts being deeply related. The Brahmi in further past may, most likely, have been written in boustrophedon style.

There are 45 Brahmi letters. Around 45 odd characters of the Harappan script make up almost 100 percent of the inscriptions. The core set of symbols used in the Harappan script are seen to have almost completely been preserved in later Brahmi. It has been noted by Parpola that there are around 300 Harappan symbols. Out of these, more than 200 symbols occur less than 10 times each. Similar to any logo-syllabic script, these characters, including their variants, are more in number but much less in actual occurrence. As in the Brahmi, the Harappan characters too can be classified into a few primary ones and then into many more derivatives of these primary characters.

The Brahmi and the later derivatives of the Brahmi too share this trait of using a large number of variants of a few basic symbols. This is another telltale sign that link the Harappan with the Brahmi. In the Brahmi and its derivative scripts, there are basic vowel and consonant symbols. The vowel sounds are combined with the consonant ones by using different variants of the consonant symbols. The vowel signs are combined not in its original form but in an altered form in such conjuncts. Moreover, conjuncts and ligatures are used in the Brahmi family to combine two or more consonant sounds too. Similar traits are noticed in the Harappan inscriptions too. In this script too we find various conjuncts of the same symbol giving rise to a wider range of characters and sounds.

A study of the use of the Harappan script may be of importance in deciphering the meaning behind the various inscriptions. Harappan inscriptions are found imprinted on a variety of objects. However, the most important of these are easily the seals that we have from this civilization. Major Bronze Age cultures have this typical trait of using stamped seals for regulating trade. Packages of trading materials in these cultures are known to have commonly been sealed by stamping seals on soft materials like clay.

All through the various Bronze Age cultures we find a widespread use of seals similar to the ones associated with the Harappan culture. In fact, such seals are believed to have contributed an important part in development and evolution of hieroglyphs and the rebus representation of sounds, during the Bronze Age. Experiments with representations of various symbols resulted in the evolution of scripts and writing systems in these cultures. The development of particularly the rebus principle both in Mesopotamia and in Egypt paved the way for a breakthrough in representing language symbolically. Moreover, imprints on enduring surfaces such as walls and seals provide us with a better glimpse of these ancient cultures in comparison to writing on perishable materials such as papyrus and cloth. In this respect too, the seals are of great importance in our study for better understanding of such cultures.

Though the seals in the Harappan culture may have been used for a variety of purposes, the most likely major use (as in other contemporary cultures) must have been in trade transactions. Their most probable use must have been to mark ownership and as tags for goods. The impression of these Harappan seals must have served as signatures. The reverse sides of these seals often show traces of packing materials and imprints of woven cloth, reed matting, etc, a testimony to their use in business dealings.

The icons that we find on the Harappan seals include bulls, buffaloes, goats, tigers, crocodiles, etc. Some of these seals also exhibit figures of human beings in various postures. Geometrical figures

include wheels with spokes, the Swastika, slant lines, etc. Trees too are found to be represented in these seals. In other Bronze Age cultures, the inscriptions on seals were used to signify (among other things) the origin, the destination, the ownership and the type of goods being traded.

There is ample evidence proving extensive trade relations of the Harappans with contemporary cultures in their neighbourhood and beyond. With interaction between cultures, particularly though trade (which invariably involve transaction of commonly held protocols between the involved cultures), there is no reason for not believing that the Harappan seals too served similar (if not same) purpose. With such widespread interaction between cultures, a flow of cultural traits between the interacting cultures is always seen to take place. This is bound to give rise to similarities in cultural habits, including food, clothes, social interactions, norms and even language and writing. This is a very natural and continuous process that is evidenced even in today's world.

Thus it is possible that various cultural traits from neighbouring cultures (at least) seeped into the Harappan way of life, while traits of the Harappan culture too were traded over to these other cultures. As they had co-existed on some common ground for at least some point in time, they are bound to have shared some common perceptions of culture. While studying a certain period of time in general and human-expressions during the time in particular, it is important that we give proper emphasis on this point too. Languages and writing systems of various interacting cultures offer one of the most important aspects in this regard and are bound to have the telltale signs of such interaction left in them.

Many of the 5000 odd Harappan inscriptions found are duplicates. In total, there are about 400 characters used in these inscriptions. However the number of basic signs used are much less as many of these 400 odd signs are conjuncts or ligatures of the fewer basic ones. The inscriptions found mostly on the seals are quite short, the longest being 17 symbols long, spanning over 3 lines. The longest ever inscription found from the sites is 26 characters long.

6 DECIPHERMENT OF THE SCRIPT

Brahmi Signs:

Though a few variants of the Brahmi alphabet system have been known to exist, with the evolution of Brahmi characters, the core signs are seen to be quite consistent over time. The syntax of their usage has also been found to be roughly consistent throughout this evolution process. Lists of Brahmi numerals, vowels and consonants are provided here in fig. and fig , respectively:

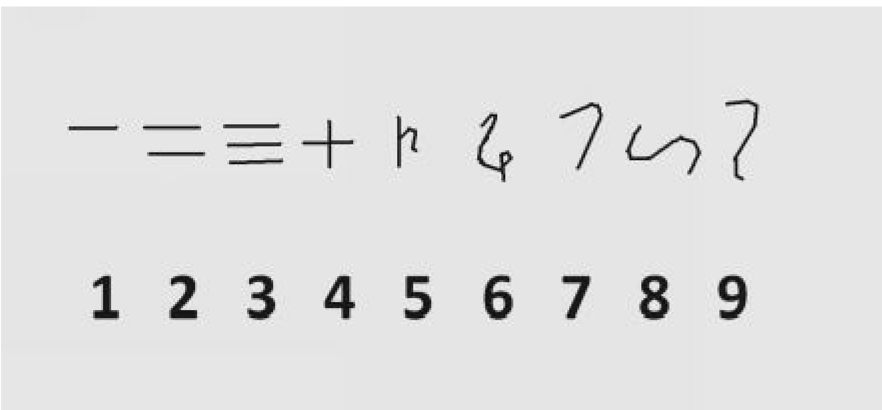


Fig. 2 : Brahmi numerals from 1-9.

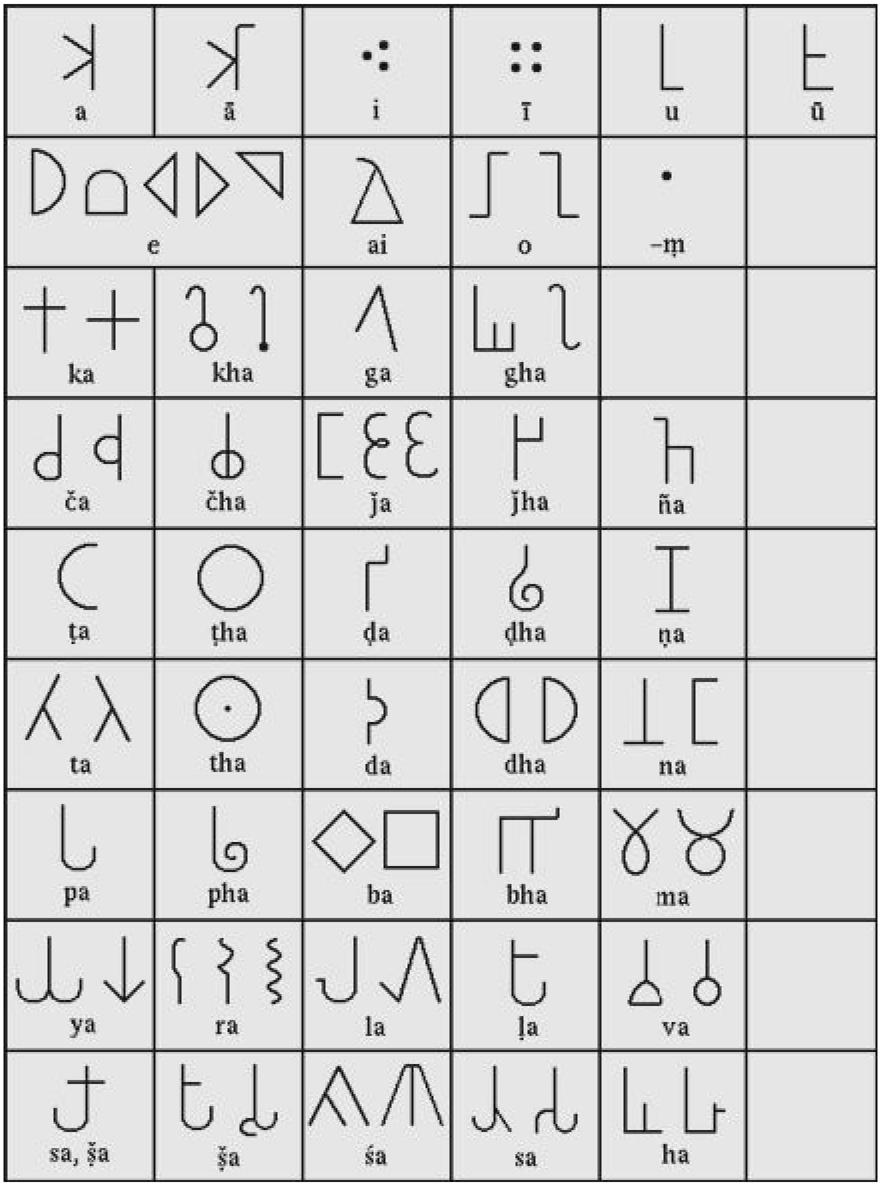


Fig. 3 : Brahmi vowels and consonants.

These are the commonly used Brahmi characters used over time. As we can see from the lists, few variants of many of the characters have been used. Classical Sanskrit and Prakrit variants use around 49 characters, including 14 vowels, 33 consonants and 2 special characters. The consonants are divided into guttural, palatal, retroflex, dental, labial, semi-vowels, sibilants and the aspirate. However, a few of the Brahmi characters became less commonly used over time, making the total number of commonly used characters at around 45. The vowels that became less and less used over time include r (short), used as in Krsna (Krishna); r (long), used as in pitrnam (pitranam, or of father/fathers), etc.

Of these 45 odd Brahmi characters, as expected with any alphabet, only a few occur in inscriptions most of the times. A frequency-analysis of the occurrence of these characters may be performed. Such study of the frequency of occurrence of signs gives us a good idea about the sounds most prevalent in a given system of writing. The 10 most commonly used consonants in the Brahmi script, roughly based on the descending order of frequencies, is shown in fig.4.



Fig. 4 : ten most commonly used consonant sounds in Brahmi.

These 10 symbols together make up more than 70 percent of usage of characters in the Brahmi. The accompanying sounds are among the highest in priority of usage in the underlying language families (Sanskritic or Prakritic, as the case might be). It may be noted that some of the Brahmi characters, like the symbol for ‘ra’, took a variety of forms. Time and place must have played a big role in determining the form of these symbols being used. Moreover, the underlying language too must have contributed towards making a given sound being more often used than others. For example, both these language families have a tendency to end words with the sounds ‘sa’ or ‘sya’. We find the symbols for both ‘sa’ and ‘ya’ to be in the list of most commonly used Brahmi characters for this reason.

As we look at the evolution of the Brahmi signs over time, we find (much expectedly, as with any other script) that there is a tendency of them towards becoming more and more compact and simpler to write. This seems to be one of the most prominent driving force behind the evolution of scripts. Minor adjustments depending upon time and place are expected though. However, if we concentrate our attention on the ‘big picture’ of evolution, we inevitably arrive at such a trend. Just to get a rough idea of this, we may consider the evolution of a few Brahmi signs over time into corresponding characters of the modern Devanagri script (a daughter-script). Fig. 5 shows the concerned evolution of a few characters over time.

Apart from the evolution of signs, resulting from a push towards a growing convenience of use, the signs may also shift their places in the list of prominence of use. This shift takes place over time and may also involve local influences of culture. For example, with the evolution of the underlying language itself, a few of the characters (corresponding to various sounds) of a script may become less used, while some others may come to use more often. However, such a shift of the characters in the prominence-list is a very gradual process, generally, leaving behind trail marks of telltale signs for us to investigate.



Fig. 5 : Evolution of a few Devanagri characters over time.

In the Brahmi script, apart from the 10 characters included in the priority-list of usage, the symbol or ‘ca’ too is a very often used one. It gained in prominence over time. Other symbols included in the list which seem to have gained in priority of usage, are ‘ta’, ‘va’, ‘ra’, ‘ka’, etc. Symbols that seem to have lost prominence over time, a little bit, include ‘sa’, ‘ma’, ‘pa’, etc.

However, in most cases, this shift is not very pronounced. Most of these shifting of places by the Brahmi symbols, with a few exceptions, averages less than 3 percent, over a period of approximately 1600 years. Some of the exceptions, though, have a much larger shift. Another trend that is to be noted, not only in the Brahmi, but also in any script, is that symbols and sounds, with less probability of occurrence, change their positions very little over time. In fact, less the probability of occurrence of a given sign, less is the probability of it being shifted in the priority list. This is seen to be the general trend with the Brahmi characters and sounds too.

Symbols placed near the top of the priority list, on the other hand, are seen to have a much larger probability of being shifted about. The percentage gain or loss in priority of usage for a few among them may even be quite substantial. Over certain periods of time, a few from these few signs, with a large enough gain or loss in percentage, may be seen to shuffle places to and fro. Studying these over large enough periods, though, reveals that the average all these shifts in percentages is more constant than the individual variations. In a very few (and exceptional) cases only, there may be a sudden and large change in position in the priority list. More often than not such sudden shifting is seen to be

resulting from a loss in priority and not from a percentage gain in usage.

The Brahmi family of symbols, being used over a vast area and over millennia, had a number of variations, as expected. The various symbols used for sounds like ‘ra’, ‘e’, etc., are instances supporting this point. It is such variations in the Brahmi script, depending upon temporal and spatial elements that indeed gave rise to its ‘daughter scripts’ later on. These variations, evolving separately, gave rise to scripts pertaining to Devanagri, Bengali, Tamil, Punjabi, etc.

Harappan Signs:

It is known to us that the Harappan signs were being used in several parts of the Indian subcontinent until around 400 BCE. There seems to be a gradual and natural transformation of these signs into the Brahmi, later on. The total number of the Harappan signs and their derivatives, found till date, are quite a few (around 400), though. But looking deeper, a much smaller core set of symbols emerge and these few signs seem to give rise to the rest, in the form of conjuncts and ligatures. The 10 most commonly used Harappan symbols is shown in fig. :

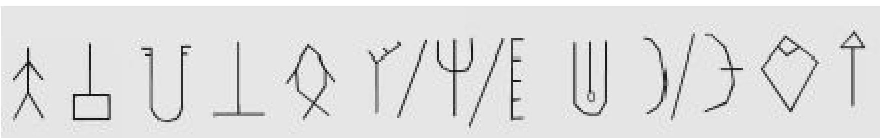
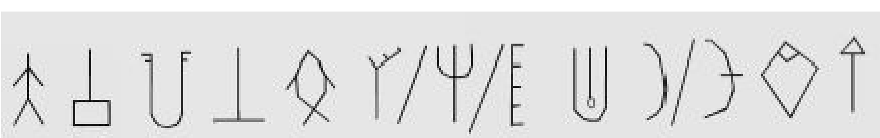
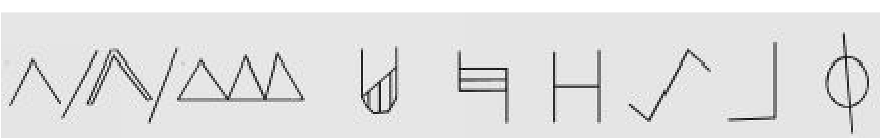


Fig. 6 : 10 signs in Harappan that have the maximum frequencies of occurrence.

Around 45 odd signs out of the total number of Harappan signs found make up almost 100 percent of the inscriptions, in some form or other, as said earlier. Out of these 45 signs, around 40 are readily distinguishable. These form an almost exclusive and unique set. The primary signs are seen to have many variants, as in Brahmi. Many of these provide us with quite a vivid picture of their evolution, depending upon the factors of time, place and usefulness. Even minor adjustments in such signs, depending upon these factors, are noteworthy. Here is a list of such signs in the Harappan:







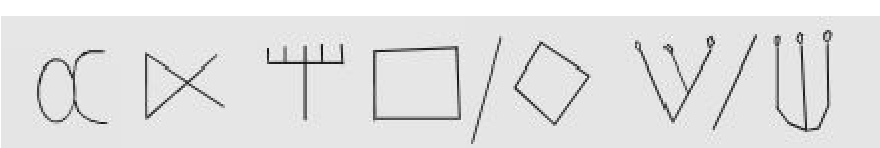




Fig. 7 : List of a few basic Harappan signs.

Many of the signs in this list are the same as or are very similar to the corresponding Brahmi signs. These are similarities that simply cannot arise from mere chance. It is also to be noted that the most frequently used signs in the Brahmi look so similar to the most frequent Harappan symbols. The signs for ‘va’, ‘ta’, etc., in the Brahmi script are a few such instances, where we have corresponding same or similar signs in the Harappan. A statistical analysis of usage of both the scripts reveals a further degree of similarity. There are, sometimes, a number of archaic forms of the same symbols found in the Harappan.

The Harappan script transformed naturally into the Brahmi, depending upon the factors channelizing evolution of scripts. We can consider a few examples of this natural evolution and study the natural evolution involved. This is similar to the evolution of the Devanagri and other daughter scripts from the Brahmi itself. Let us concentrate on the letter ‘ta’ in the Brahmi. There is no denying the fact that it is a direct transformation of the corresponding Harappan sign as shown in fig. 8.

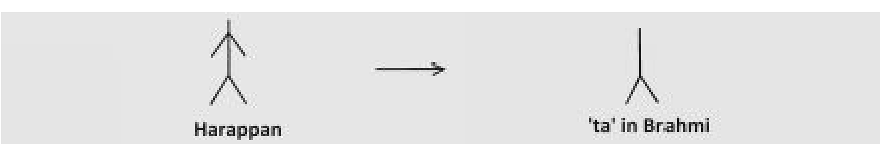


Fig. 8 : Transformation of the symbol for ‘ta’

The sign in Brahmi for the sound ‘pa’ is another case in point. Using the principles of compactness, ease of writing and ‘running strokes’, we can very well explain its evolution from the corresponding Harappan sign. Fig. shows this transformation.

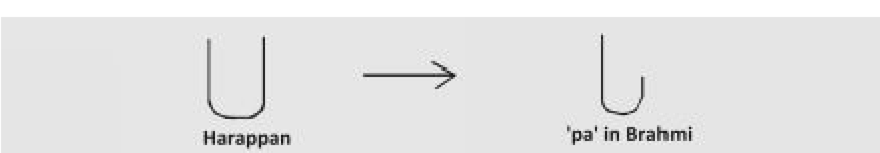


Fig. 9 : Transformation of the symbol for ‘pa’

A similar evolutionary trait is seen in the transformation of the symbol for ‘sa’. The ‘urn’ sign in the Harappan is a precursor to the later ‘sa’ in the Brahmi, fig. . This symbol is particularly frequent in

the copper tablets.

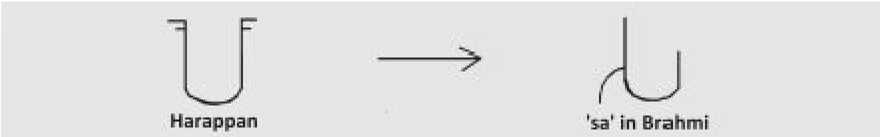


Fig. 10 : Transformation of the symbol for ‘sa’

We find many versions of the same symbols, with minor and progressive changes, in the Harappan, as well as in the Brahmi. This very ‘urn’ symbol is a case in point. Such gradual transformation is a feature common not only with the Brahmi family of scripts, but with any script in the world. The evolution of the modern English alphabet and the number system too shares this feature.

The symbol for ‘da’ in the Brahmi is another example in this regard. Its evolution is an excellent example of how a change in orientation brings about transformation, fig. .

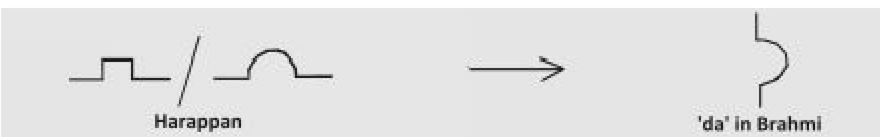


Fig. 11 : Transformation of the symbol for ‘da’
(Note the change in orientation).

We find allographs of the same signs in the Harappan inscriptions. This is a clear marker of the change in symbols with evolution of the script. With time, the signs evolved, making them more and more compact and easier to write. The ‘crab’ sign, common in the inscriptions, may be considered as an example, fig. .

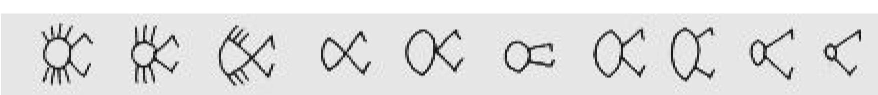


Fig. 12 : Transformation of the ‘crab’ sign (After Parpola.)

In fact, both the ‘crab’ sign and the ‘fish’ sign must have evolved together to form the later day variants for ‘ma’. Fig. and fig. shows the conversions involved.

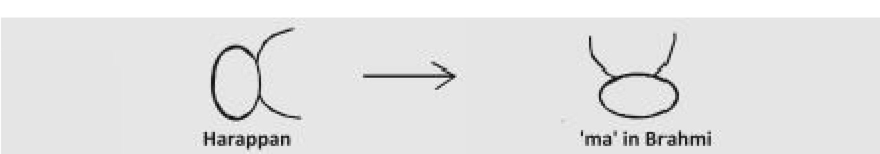


Fig. 13 : Transformation of the ‘crab’ sign into ‘ma’ in Brahmi.



Fig. 14 : Transformation of the ‘fish’ sign into ‘ma’ in Brahmi.

A similar transformation in shape happened with the symbol for ‘pha’ in the Brahmi, fig. . Here a few strokes are seen to be omitted in later versions, for simplicity of writing.

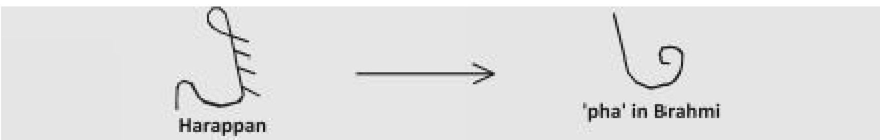
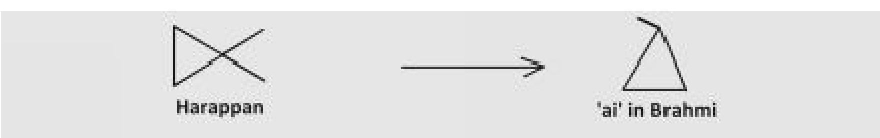


Fig. 15 : Transformation of the symbol for ‘pha’

Another Brahmi sign that may be considered in this regard is the symbol for ‘ai’. Similar to the signs for ‘ma’, here too we find variants that seem to have evolved from the original variants in the Harappan. Fig. 16 and fig 17 show this conversion.



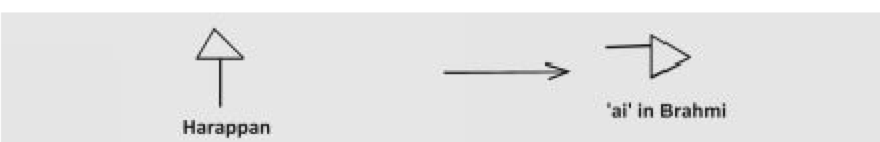
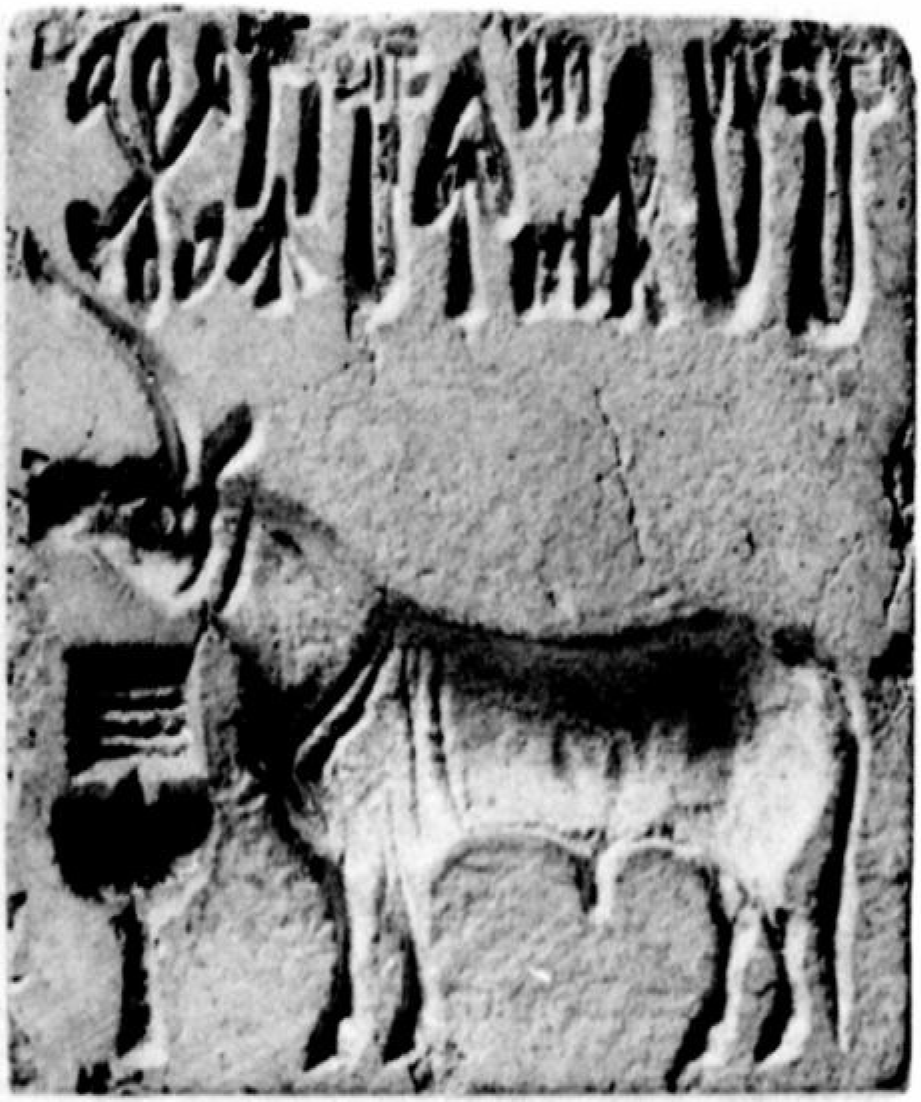


Fig. 16 and fig. 17 : Transformation of the symbol for ‘ai’

It is possible that we come across a few more intermediate variants of such signs. Finding such intermediates may further enhance our understanding of the evolution of the Harappan symbols into the Brahmi alphabet. Moreover, this will provide us with even better means to script the complete history of this evolution.

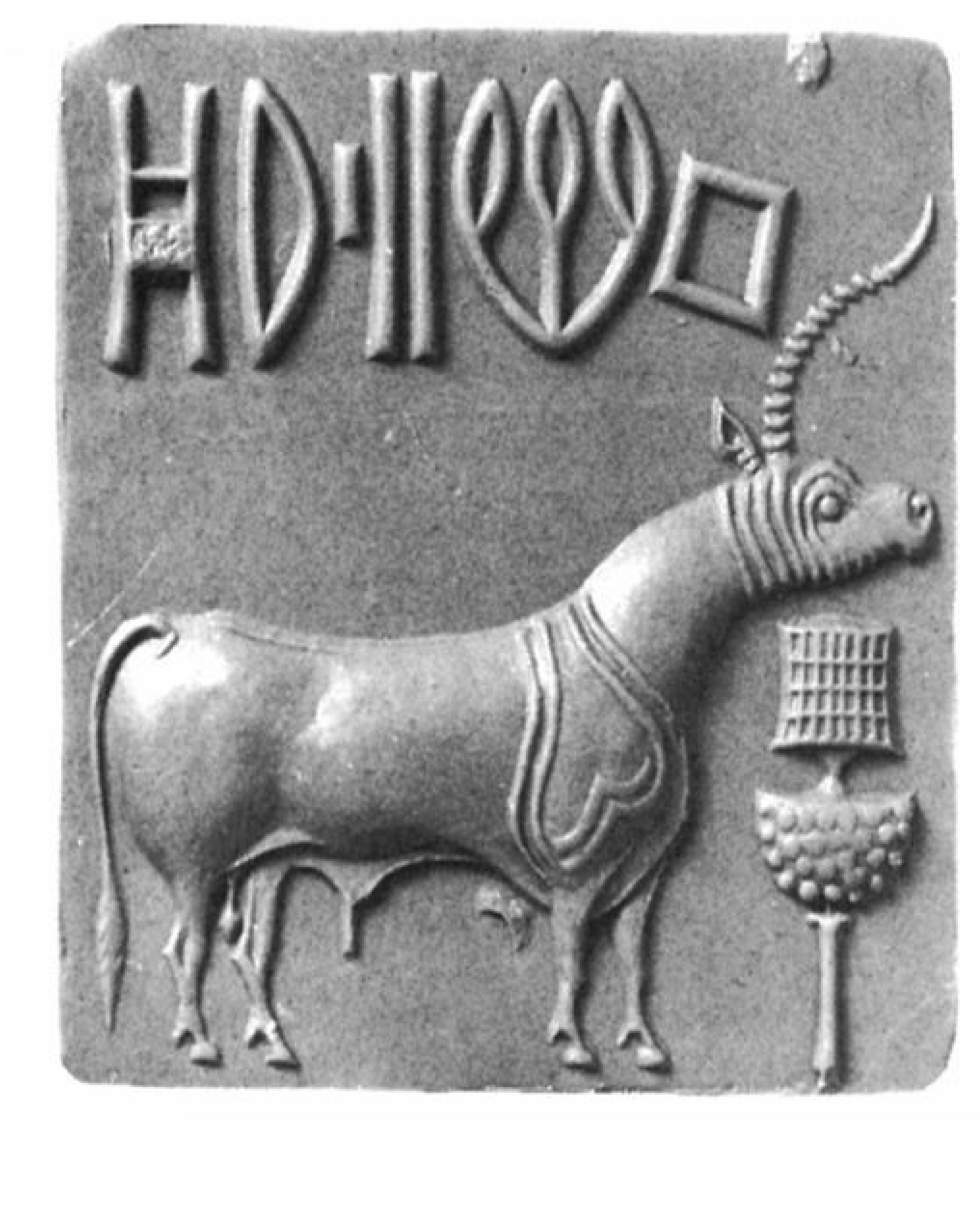


Modern impression of the seal H-598 from Harappa (Parpola 1994:232).



The seal M-112 from Mohenjo-daro (CISI 1: 40)

The seal M-112 from Mohenjo-daro (CISI 1: 40).



H-6 from Harappa (CISI 1: 50).



Impression of the seal H-669 from Harappa (CISI 2: 310).

M-453 from Mohenjo-daro (CISI 1: 111).

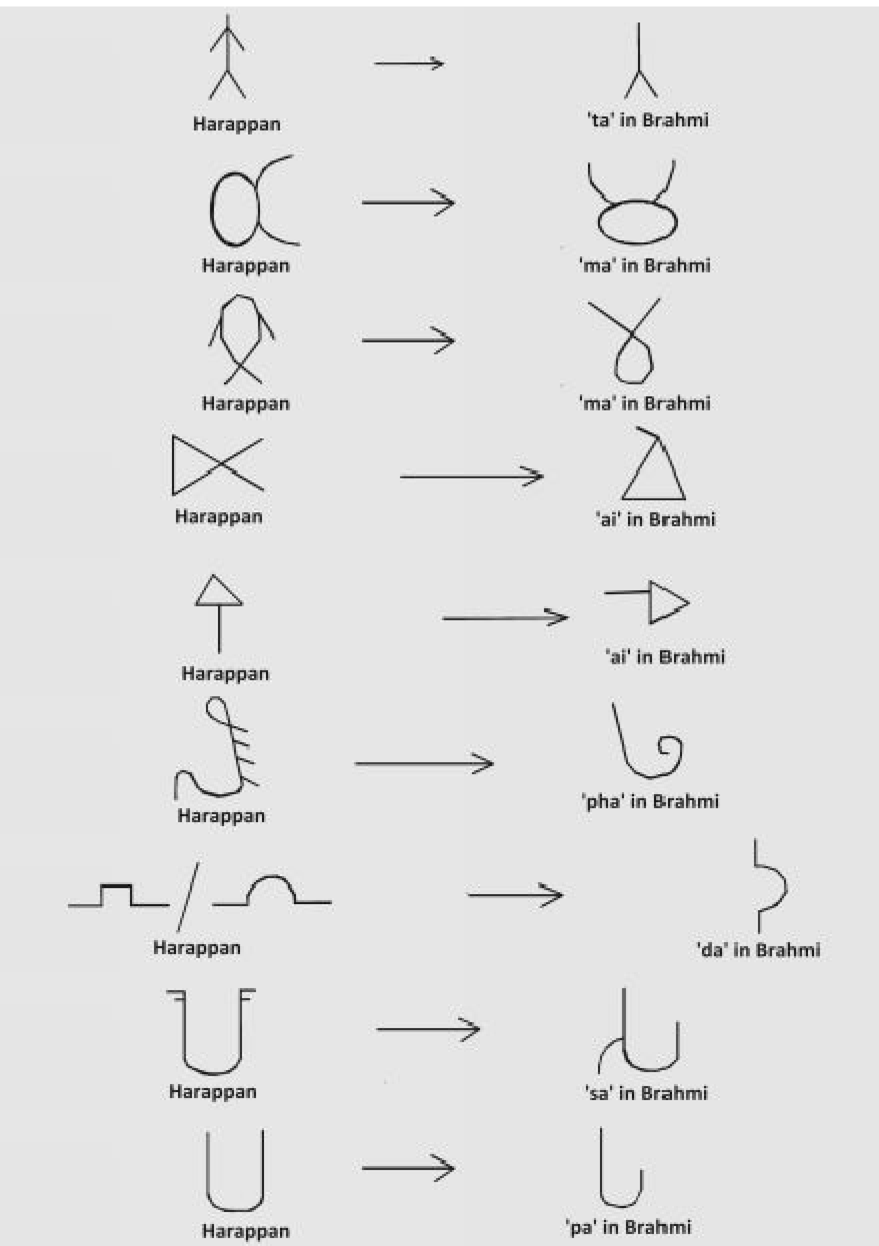


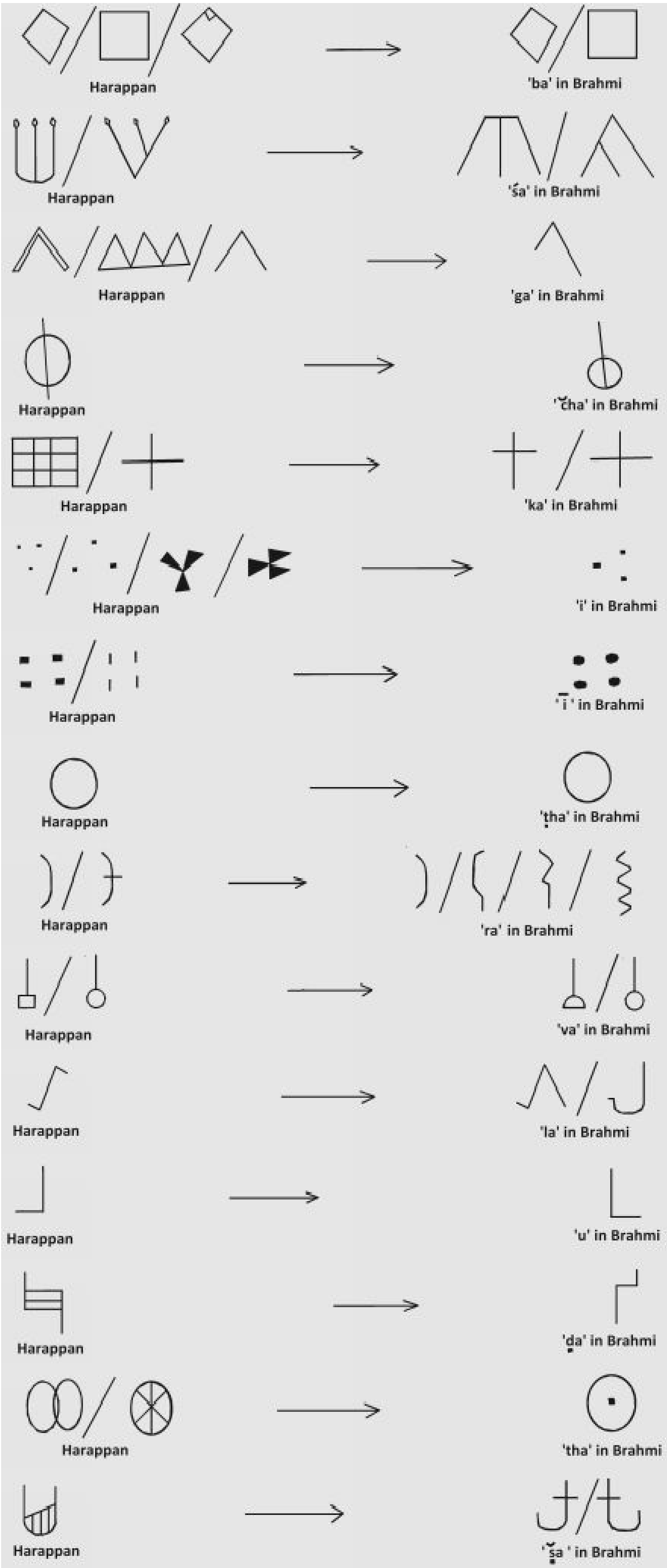
Complete List and What to Expect:

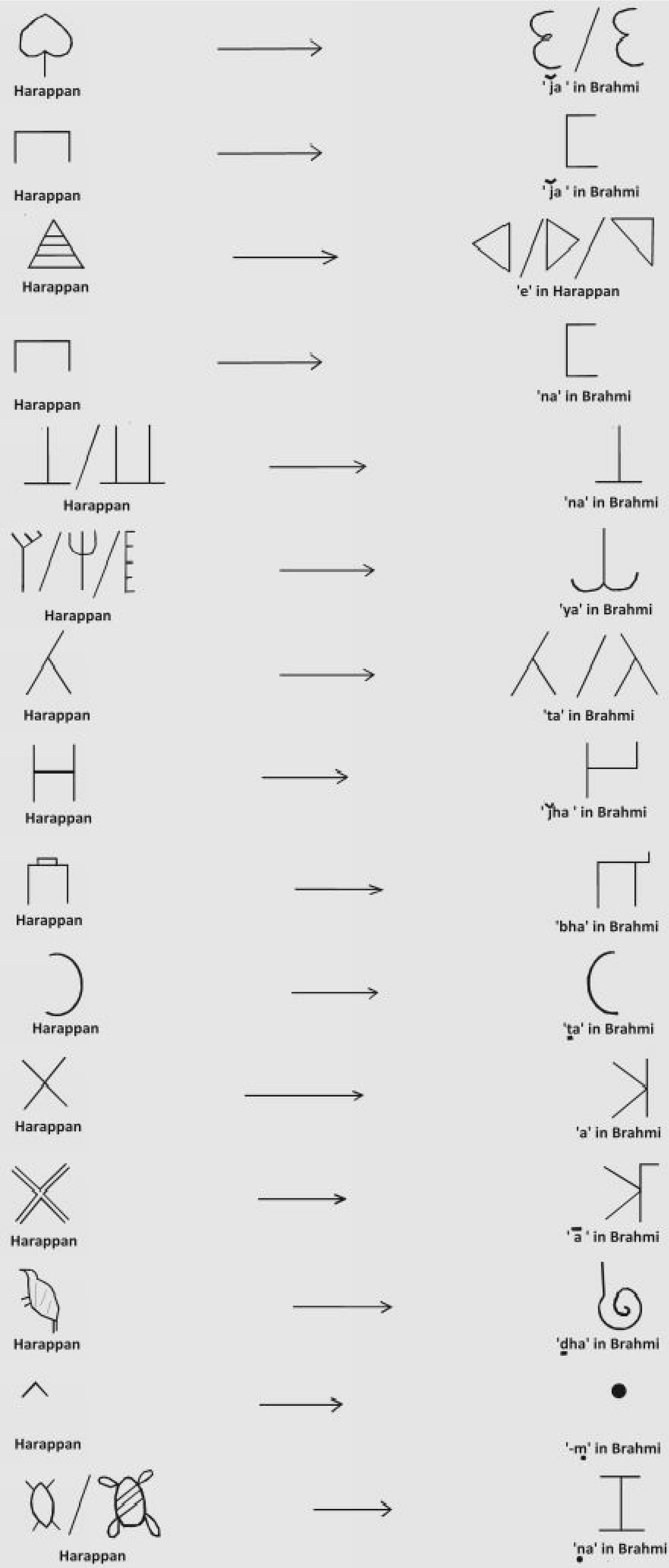
D epending upon the traits of evolution already discussed, we may prepare a list of Harappan symbols corresponding to the Brahmi. Such a primary list of characters may be of great aid to us in studying the Harappan inscriptions and understanding them. The chaotic situation that prevails due to such a large variety of characters in the inscriptions may also be mitigated by using this primary list of signs in understanding their meanings.

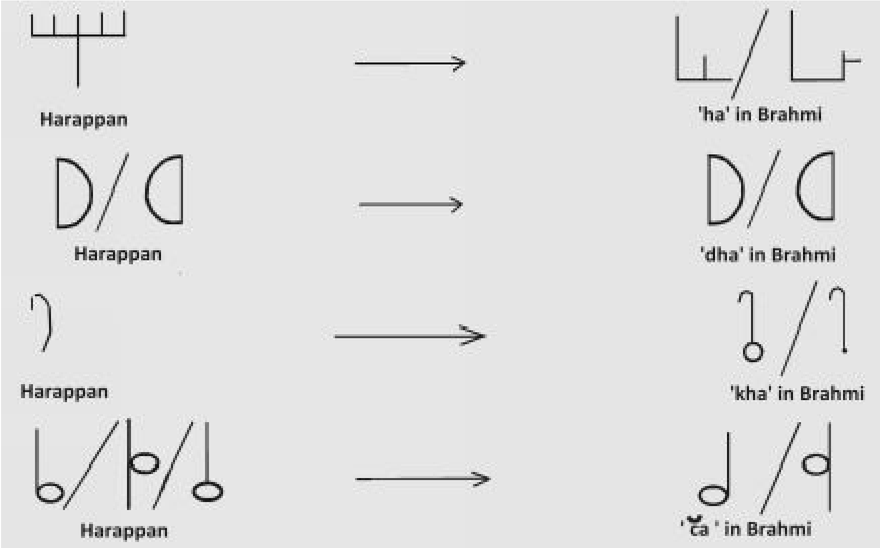
We will first tabulate the Harappan signs corresponding to the Brahmi, in the manner of the previous section and then go on to form a more comprehensive list. We will also discuss the underlying language of the inscriptions and what can be the possible meanings of these inscriptions, before we attempt to decipher them.

Here is a list of Harappan signs, the corresponding Brahmi signs and the sounds concerned:




Harappan
'ba' in Brahmi
Harappan
'śa' in Brahmi
Harappan
'ga' in Brahmi
Harappan
'c̆ha' in Brahmi
Harappan
'ka' in Brahmi
Harappan
'i' in Brahmi
Harappan
'ī' in Brahmi
Harappan
'ṭha' in Brahmi
Harappan
'ra' in Brahmi
Harappan
'va' in Brahmi
Harappan
'la' in Brahmi
Harappan
'u' in Brahmi
Harappan
'ḍa' in Brahmi
Harappan
'tha' in Brahmi
Harappan
'ṣ̆a' in Brahmi


Harappan
'ǰa ' in Brahmi
Harappan
'ǰa ' in Brahmi
Harappan
'e' in Harappan
Harappan
'na' in Brahmi
Harappan
'na' in Brahmi
Harappan
'ya' in Brahmi
Harappan
'ta' in Brahmi
Harappan
'ǰha ' in Brahmi
Harappan
'bha' in Brahmi
Harappan
'ṭa' in Brahmi
Harappan
'a' in Brahmi
Harappan
'ā ' in Brahmi
Harappan
'ḍha' in Brahmi
Harappan
'-ṃ' in Brahmi
Harappan
'ṇa' in Brahmi


Harappan
'ha' in Brahmi
Harappan
'dha' in Brahmi
Harappan
'kha' in Brahmi
Harappan
'ča ' in Brahmi

Primary list of signs.

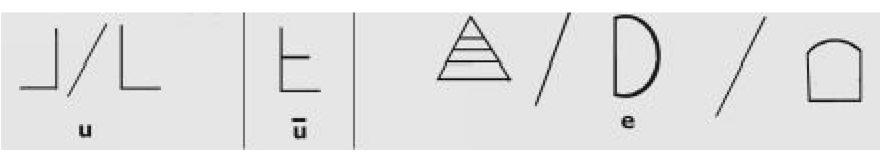
This flexible primary list of Harappan signs and their Brahmi equivalents covers almost all major symbols of both the scripts. The signs have been arranged taking into consideration their corresponding frequencies of usage, evolutionary traits and the telltale marks of evolution (as discussed before). In their proto states, a few signs in the Harappan seem to have common origins, following similar shapes. With time, however, these seem to have given rise to more signs, corresponding to separate sounds. In this way, similar-looking shapes and signs have culminated into more distinguished sound-features in the Brahmi.

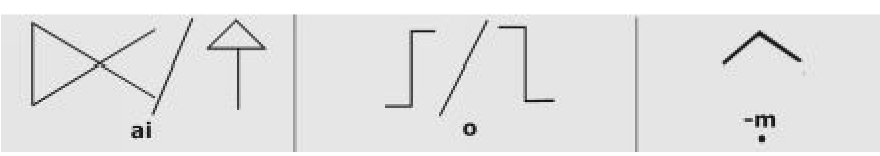
Sometimes, in the ancient writing samples found in the Indian subcontinent, we find that a mixture of Harappan and Brahmi features has been used. This definitely points towards a continuous evolutionary process that transformed the Harappan script into the later day Brahmi. This also explains why many of the Harappan signs seem to have been simply carried forward (even in actual form) in the Brahmi script.

We can now form the list of signs of the Harappan, corresponding to those of the Brahmi, in alphabetical order (followed in the Brahmi script). This will mean a rearrangement of the elements of the primary list of signs. Also, it is to be noted that in these lists it is not possible to mention all allographs of the respective signs. In the following list major allographs have been used however.

Vowels:

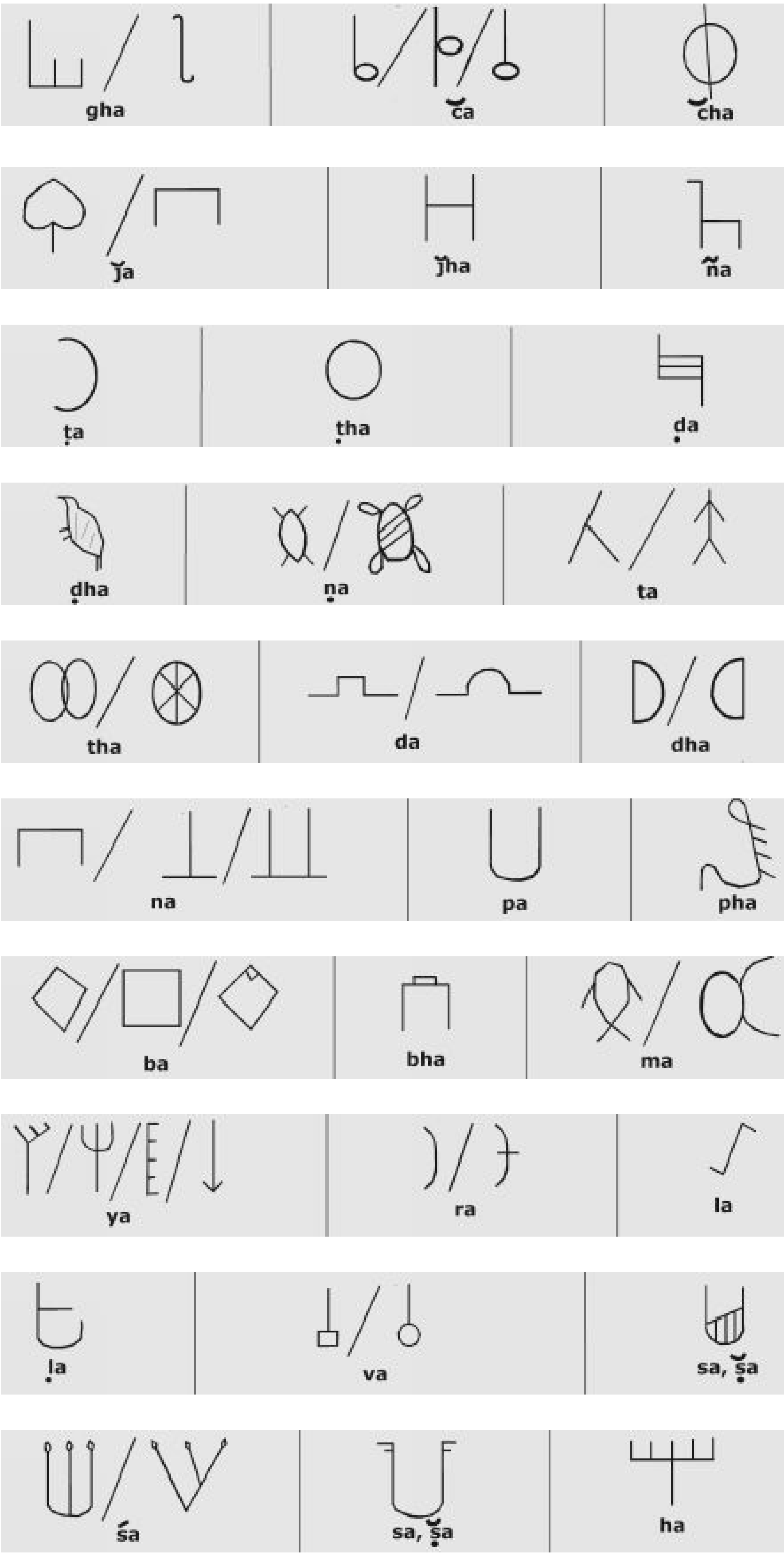






Consonants:





Considering the fact that the Harappan script may have been proto-Brahmi, the underlying language to be expected should be Sanskrit, or proto-Sanskrit, or derivatives of Sanskrit. Many of the rules of evolution that apply to scripts are equivalently true for languages too. Like scripts, languages too render themselves to similar evolutionary inspections, as they too carry imprints of their journey down the ages.

The Sanskrit language itself has evolved and changed over time (and place). However, it is distinguishable due to the various cultural and evolutionary traits it carries. This is equally true for any language in the world. Take the example of English. It has evolved a great deal since the Middle Ages. The English of Shakespeare was in many ways different than the English we have today. Again, today's 'Queen's English' is different from the American version of the language. This does not bar us from recognizing English today as a single unique language. The various evolutionary traits that it carries in its heart render themselves to our analysis regarding the evolution itself.

Similarly, we have knowledge about the evolution of Sanskrit-family of languages since the time of the 'fall' of the Harappan civilization. We have the story of their evolution since a given point in time. There is no reason to believe that the same or similar principles of evolution did not apply before that point in time too. It is far more logical and real to think otherwise.

The most likely use of the Harappan inscriptions seems to have been for trade transactions. As such, they are supposed to carry a number of proper nouns, describing the source and ownership of the goods. Even today, tags associated with trade transactions are supposed to carry such information. Name of the company selling the goods is expected today on such tags. Discovery of various Harappan seals from as far as Mesopotamia and the Gulf endorses this view. A few exceptions to this may however be expected as objects with Harappan inscriptions on them may have been used for other purposes too.

Inscriptions:

The inscriptions need to be investigated in the light of the list of signs that we have found. A few of the major inscriptions, that are found, have been investigated here. The major seals the inscriptions on which we have tried to read include M-314a, H-129a, H-130a, H-131a, H-132a, H-133 a, H-134a, H-135a, H-136a, H-137a, H-150a, M-373a, M-478A, K-15a, H-255A, H-375-A, MD-1429, M-899a, C-23a, M-288a, M-112, M-241, H-669, H-723, M-172, H-6, M-1202 and H-9. Among the major texts studied are text numbers 4002, 4003, 4004, 4005, 4006, 2901, 2847, 4012, 4013, 4014, 4015, 4016, 4017, 4018, 4019, 4020, 4021, 4022, 4023, 4024, 4025, 4026, 4027 and 5256. These major inscriptions have been chosen for our study in particular because they represent the outwardly variations and the underlying singularity of the scripts.

Inscription on M-314a

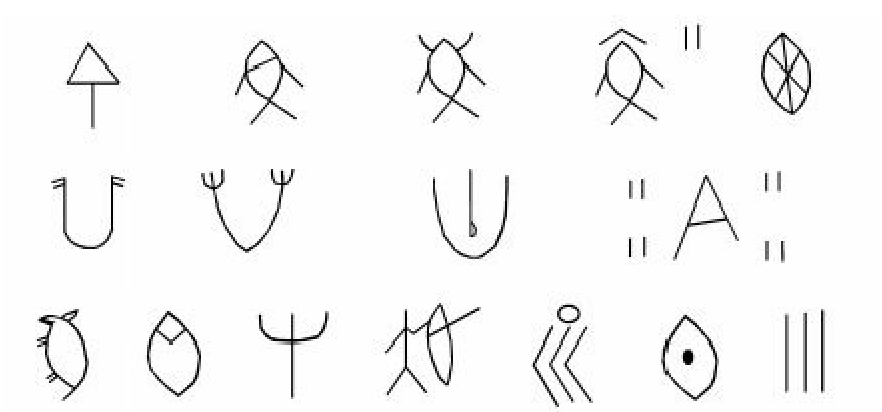


Fig. 18 : The longest known Harappan inscription

The first of the inscriptions that we study is found on seal number M-314a. Being the longest known Harappan inscription found till today, it bears special significance. Depending upon the Harappan signs that we have already listed and upon the various known allographs of these signs, we decipher the possible underlying sounds and the meanings of the inscriptions. We will read the inscriptions from right to left for obvious reasons.

Possible Deciphered sounds:
3 (after 3 in Brahmi) **tha 30** (allograph of 3 and zero) **dha-ta** (conjunct) **ya ba pha**
(e) (separators) **pa-ča** (conjunct) **ya-sa-ya** (conjunct) **sa**
tha 2 ma-m̦ (conjunct) **ma-n̦ a** (conjunct) **ma-s´a** (conjunct) **ai**

Inscription on H-129a

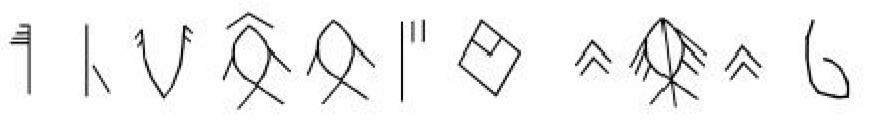


Fig. 19 : H-129a

Possible Deciphered sounds:
pha (ma-s´a) (conjunct) **ba 2 (stop) ma ma-m̦** (conjunct) **sa ta ya**

Inscription on H-130a

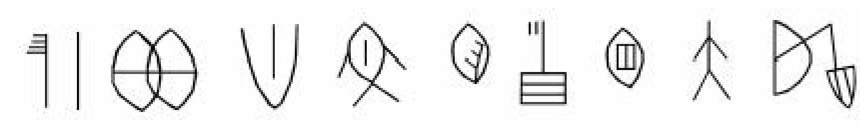


Fig. 20 : H-130a

dha-e (conjunct) **ta ba-ka** (conjunct) **va 2 ba-ya** (conjunct) **ma-s´a** (conjunct) **pa-ča** (conjunct) **tha 1 ya**

Inscription on H-131a

The seal H-131a is broken at the edges. Therefore the inscription that we have seems to be incomplete.

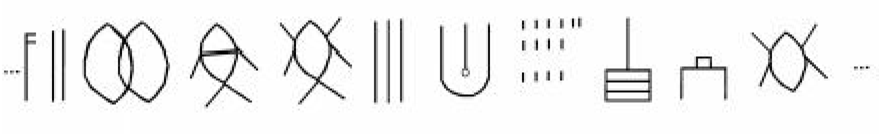


Fig. 21 : H-131a

Possible Deciphered sounds:
…ņ a bha va 14 pa-ča (conjunct) **3 ma-ņ a** (conjunct) **ma-s´a** (conjunct) **tha 2 ya**…

Inscription on H-132a

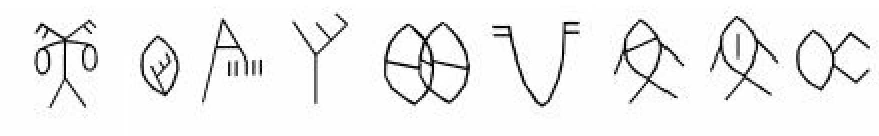


Fig. 22 : H-132a

Possible Deciphered sounds:
10 ma-s´a (conjunct) **ma-s´a** (conjunct) **sa tha ya e 5 ba-ya** (conjunct) **ta- ţ ha ya** (conjunct)

Inscription on H-133a

This seal too is not in a very good condition. The inscription on one side is not that well preserved

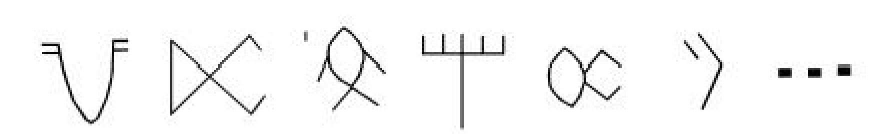


Fig. 23 : H-133a

Possible Deciphered sounds:
… (?) **2 10 ha ma 1 ai sa**

Inscription on H-134a

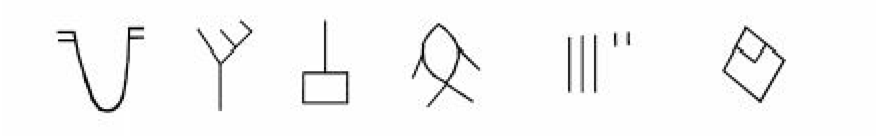


Fig. 24 : H-134a

Possible Deciphered sounds:
ba 2-3 ma va ya sa

Inscription on H-135a

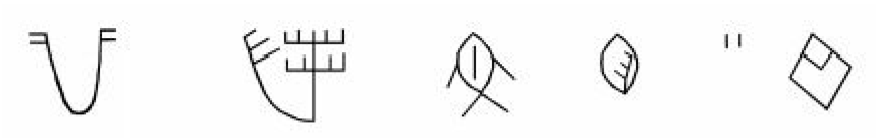


Fig. 25 : H-135a

Possible Deciphered sounds:
ba 2 ba-ya (conjunct) **ma-s´a** (conjunct) **ha-ya** (conjunct) **sa**

Inscription on H-136a

This seal is broken all over and the inscription on it is much distorted. Particularly the first characters from right are not clear.

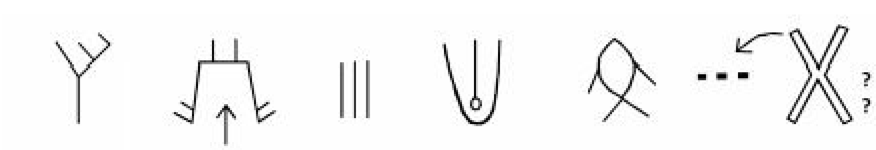


Fig.26 : H-136a

Possible Deciphered sounds:
ā (??) **… ma pa-ča** (conjunct) **3 bha-ai** (conjunct) **ya**

Inscription on H-137a

Another seal-inscription from the Harappan region, with fairly well preserved inscription.

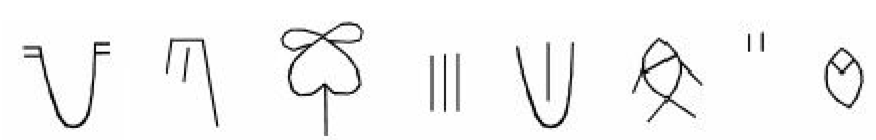


Fig. 27 : H-137a

Possible Deciphered sounds:
ba 2 ma-s´a (conjunct) **pa-ča** (conjunct) **3 ǰ a-ņ a** (conjunct) **kha sa**

Inscription on H-150a

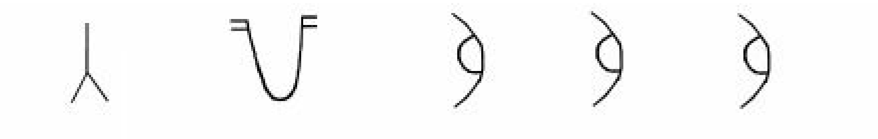


Fig. 28 : H-150a

Possible Deciphered sounds:
t ̧ a-ţ ha (conjunct) three times **sa ta**

Inscription on M-373a

This is another seal with probably incomplete inscription.

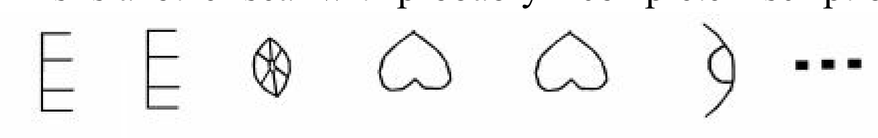


Fig. 29 : M-373a

Possible Deciphered sounds:
… ţ a-ţ ha (conjunct)**ǰ a** two times **tha ya** two times

Inscription on M-478a

The inscription on this seal is particularly totemic and a lot of rebus has been used in it.

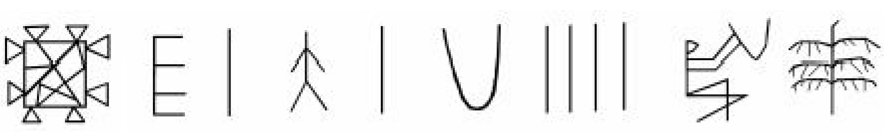


Fig. 30 : M-478a

Possible Deciphered sounds:
(?) offering to a tree by a devotee **4 pa (ta) ya** (?) worship-alter

Inscription on K-15a

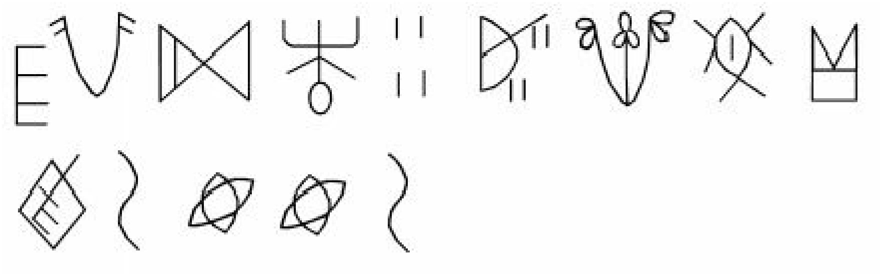


Fig. 31 : K-15a

Possible Deciphered sounds:
o tha two times o **ba-ya** (conjunct)
ba-ga ma-ņ a-s´a (conjunct) **s´a ī-dha-ī** (conjunct) **va-ta-ya** (conjunct) **ai sa-ya** (conjunct)

Inscription on H-255A

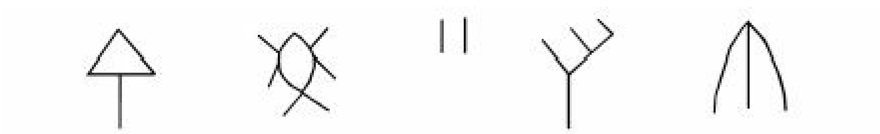


Fig. 32 : H-255A

Possible Deciphered sounds:
sa ya 2 ma-ņ a (conjunct) **ai**

Inscription on M-375A

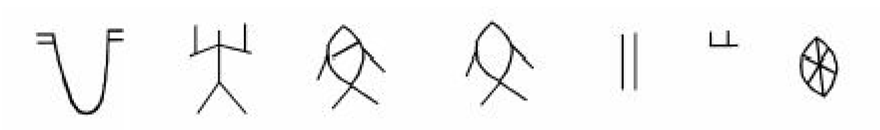


Fig. 33 : M-375A

Possible Deciphered sounds:
tha ū 2 ma ma-s´a (conjunct) **ta-ya** (conjunct) **sa**

Inscription on MD-1429

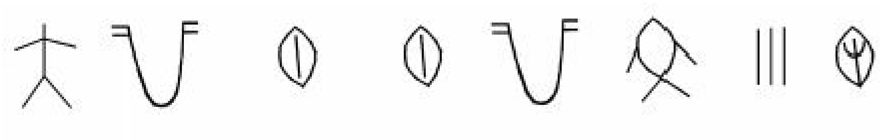


Fig. 34 : MD-1429

Possible Deciphered sounds:
ba-ya (conjunct) **3 ma sa ba- s´a** (conjunct) two times **sa ta**

Inscription on M-899a

This seal has the imprint of a one-horned animal (unicorn?) on it.

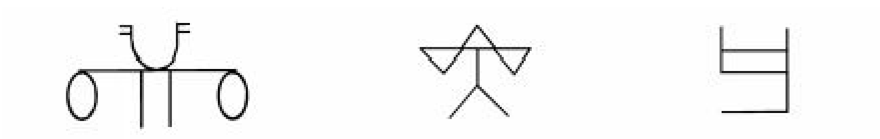


Fig. 35 : M-899a

Possible Deciphered sounds:
ña ta-ga-m̦ (conjunct) **na-sa-tha** (conjunct)

Inscription on C-23a

The inscription on the C-23a is quite totemic.

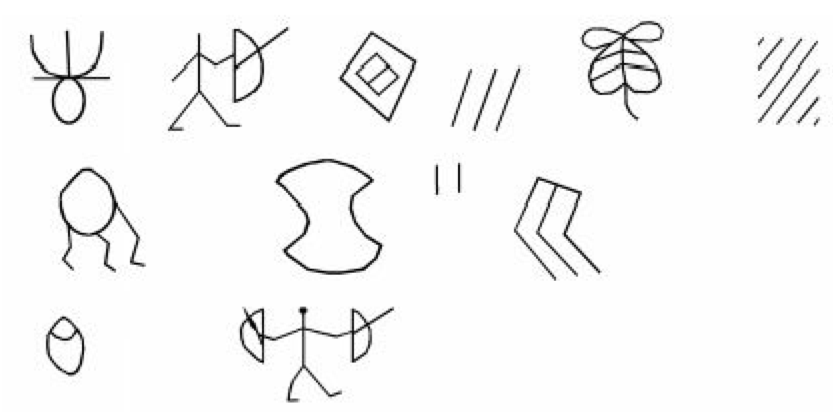


Fig. 36 : C-23a

Possible Deciphered sounds:
ta-dha (conjunct) **ba**

3 2 (?) ţ ha-(?) (conjunct?)
ka ǰ a-ņ a (conjunct) **3 ba-ka** (conjunct) **ta-dha** (conjunct) **va-ta-ya** (conjunct)

Inscription on M-288a

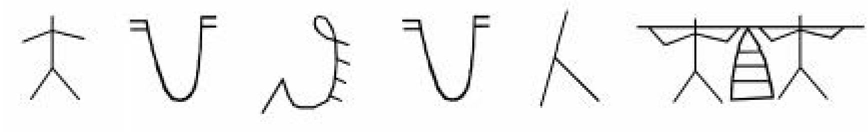


Fig. 37 : M-288a

Possible Deciphered sounds:
ta-e-ta (conjunct) **ta sa pha sa ta**

Inscription on M-112

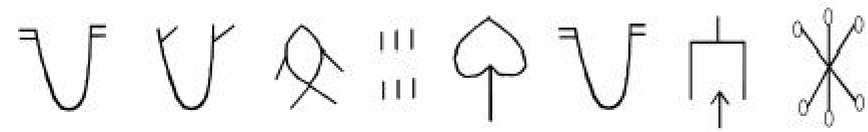


Fig. 38 : M-112

Possible Deciphered sounds:
a bha-ai (conjunct) **sa ǰ a 6 ma pa sa**

Inscription on M-241

The leftmost character on this seal is not quite clear. However, it seems to be the symbol for the sound 'ta'.

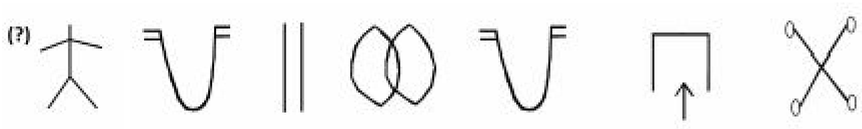


Fig. 39 : M-241

Possible Deciphered sounds:
a bha-ai (conjunct) **sa tha 2 sa ta**

Inscription on H-669

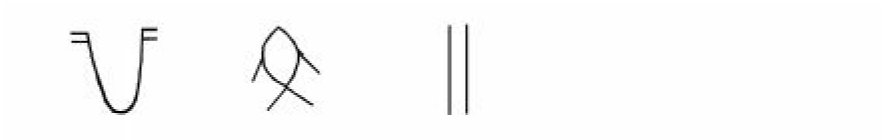


Fig. 40 : H-669

Possible Deciphered sounds:
2 ma sa

Inscription on H-723



Fig. 41 : H-723

Possible Deciphered sounds:
tha 2 sa

Inscription on M-172



Fig. 42 : M-172

Possible Deciphered sounds:
ba sa ma 9 s´a

Inscription on H-6



Fig. 43 : H-6

Possible Deciphered sounds:
ba s´a 2 1 dha ǰ ha

Inscription on M-1202

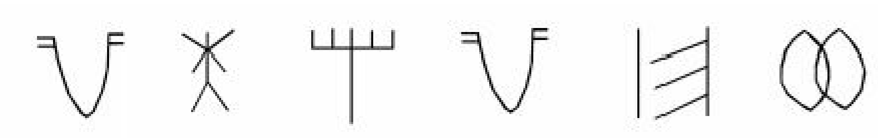


Fig. 44 : M-1202

Possible Deciphered sounds:
tha ǰ ha sa hata- ņ a (conjunct) **sa**

Inscription on H-9



Fig. 45 : H-9

Possible Deciphered sounds:
ma 7

Text 4002

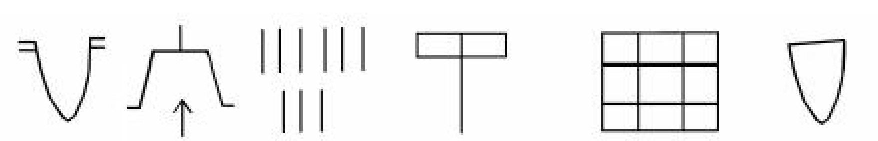


Fig. 46 : text-4002

Possible Deciphered sounds:
pa ka ba-u (conjunct) (the ‘u’ is after Brahmi) **9 bha-ai** (conjunct) **sa**

Text 4003

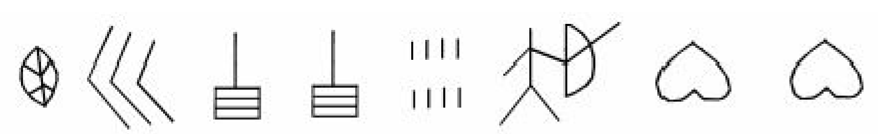


Fig. 47 : text-4003

Possible Deciphered sounds:
j˘a two times **ta-dha** (conjunct) **8 va** two times **3 tha**

Text 4004



Fig. 48 : text-4004

Possible Deciphered sounds:
kha ǰ a-ta (conjunct) **ţ a 2 ǰ a ǰ ha pa-ča** (conjunct) **ţ a**

Text 4005

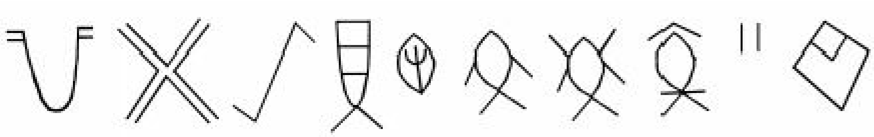


Fig. 49 : text-4005

Possible Deciphered sounds:
ba 2 ma-m̧ - s´a (conjunct) **ma-ņ a** (conjunct) **ma ba-ya** (conjunct) **ņ a la ā sa**

Text 4006

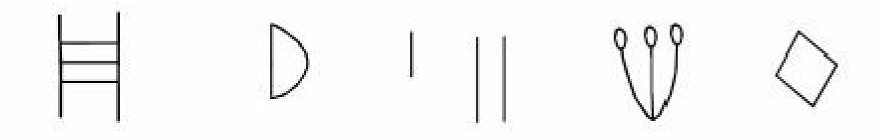


Fig. 50 : text-4006

Possible Deciphered sounds:
ba s´a 2 1 dha ǰ ha

Text 2901

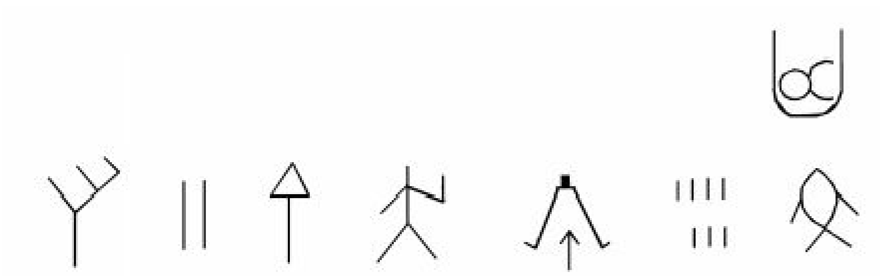


Fig. 51 : text-2901

Possible Deciphered sounds:
ma 7 bha-ai (conjunct) **ta ai 2 ya**
pa-10 (conjunct)

Text 2847



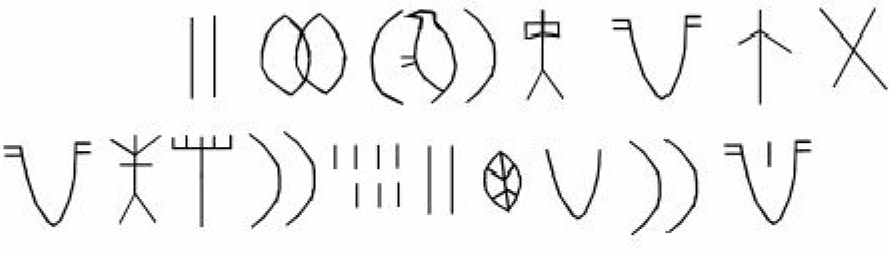


Fig. 52 : text-2847

Possible Deciphered sounds:
sa-1 ţ a two times **pa tha 2 7 ţ a** two times **ha ta- ņ a** (conjunct) **sa a ka sa ta-ba** (conjunct) **(ḑ ha) tha 2**
ba- s´a (conjunct) **10 pha sa ta-ba-tha** (conjunct) **pa** three times **ya**

Text 4012



Fig. 53 : text-4012

Possible Deciphered sounds:
ka two times **kha sa-3 pha sa ma-s´a-ī** (conjunct)

Text 4013

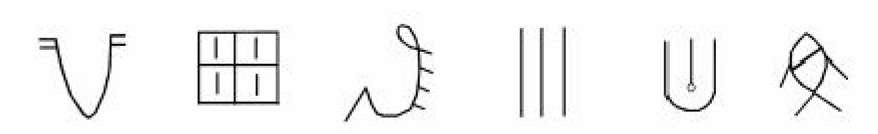


Fig. 54 : text-4013

Possible Deciphered sounds:
ma-s´a (conjunct) **pa-ča** (conjunct) **3 pha ka-ī sa**

Text 4014

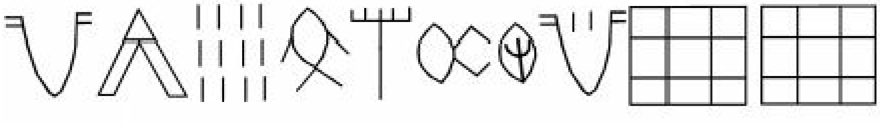


Fig. 55 : text-4014

Possible Deciphered sounds:
ka two times **sa-2 ba-ya** (conjunct) **10 ha ma 12 ga sa**

Text 4015



Fig. 56 : text-4015

Possible Deciphered sounds:
ba-ya (conjunct) **ha ma pa-ča** (conjunct) **3 ai**

Text 4016

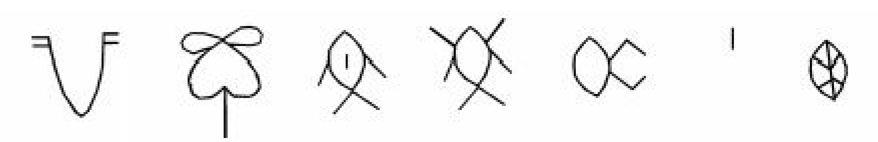


Fig. 57 : text-4016

Possible Deciphered sounds:
tha1 10 ma-ņ a (conjunct) **ma-s´a** (conjunct) **ǰ a-ņ a** (conjunct) **sa**

Text 4017

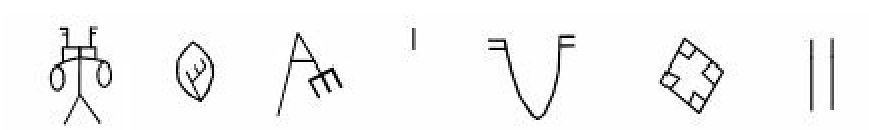


Fig. 58 : text-4017

Possible Deciphered sounds:
2 ba sa 1 e-ya (conjunct) **ba-ya** (conjunct) **ta-ba-tha-sa** (conjunct)

Text 4018



Fig. 59 : text-4018

Possible Deciphered sounds:

t¸a two times **sa**

Text 4019

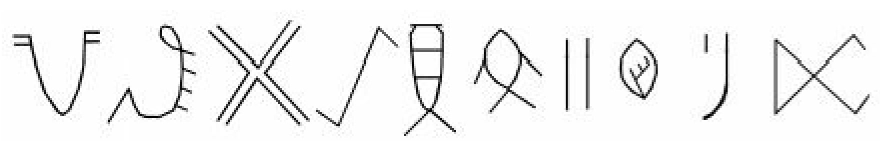


Fig. 60 : text-4019

Possible Deciphered sounds:
ai kha ba-ya (conjunct) **2 ņ a la ā pha sa**

Text 4020

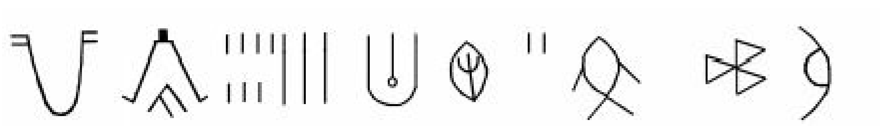


Fig. 61 : text-4020

Possible Deciphered sounds:

t¸a i ma 2 ba-ya (conjunct) **pa-ča** (conjunct) **3 7 bha-s´a** (conjunct) **sa**

Text 4021

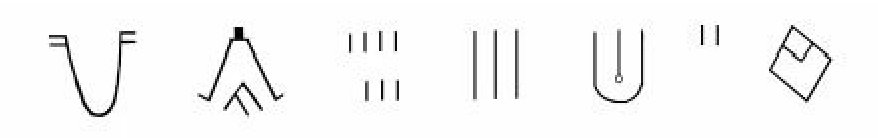


Fig. 62 : text-4021

Possible Deciphered sounds:
ba 2 pa-ča (conjunct) **3 7 bha-s´a** (conjunct) **sa**

Text 4022



Fig. 63 : text-4022

Possible Deciphered sounds:
ba 2 ba-ya (conjunct)**ma-m̨** (conjunct) **ma-s´a** (conjunct) **ai d̨ a ta ya**

Text 4023

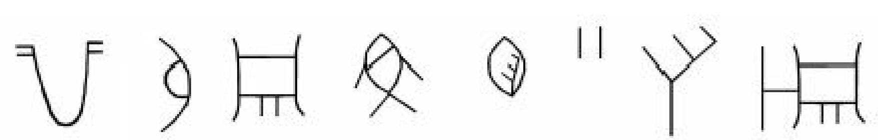


Fig. 64 : text-4023

Possible Deciphered sounds:
ña-ǰ ha-na (conjunct) **ya 2 ba-ya** (conjunct) **ma-s´a** (conjunct) **ǰ ha-na** (conjunct) **ţ a sa**

Text 4024



Fig. 65 : text-4024

Possible Deciphered sounds:
ma-m̦ (conjunct) **3 tha va**

Text 4025

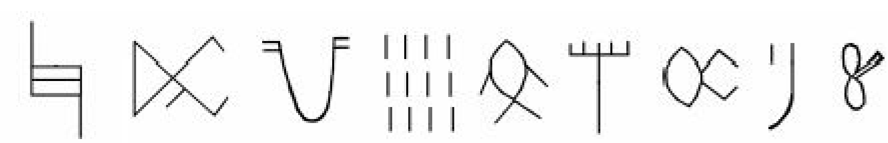


Fig. 66 : text-4025

Possible Deciphered sounds:
i kha 10 ha ma 12 sa ai ḑ a

Text 4026

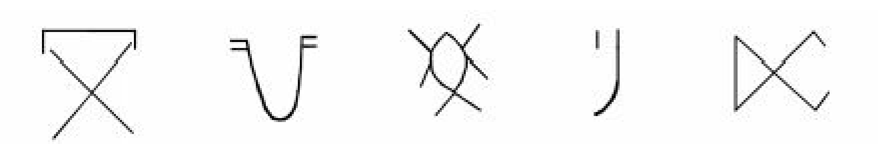


Fig. 67 : text-4026

Possible Deciphered sounds:
aikha ma-ņ a (conjunct) **sa a-na** (conjunct)

Text 4027



Fig. 68 : text-4027

Possible Deciphered sounds:
ka ba-ya (conjunct) **ha ma ţ a** two times **ba- s´a** (conjunct)

Text 5256

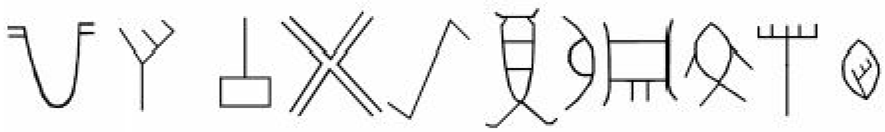


Fig. 69 : text-5256

Possible Deciphered sounds:
ba-ya (conjunct) **ha ma ǰ ha-na** (conjunct) **ţ a ņ a la ā va ya sa**

7 IMPLICATIONS OF THE FINDINGS

The first major implication that comes to mind with the discovery of an indigenous script in the ancient Indian subcontinent is the possibility of a more or less continual civilization in this area since the dawn of history. All these recent findings point towards a cultural continuity in this region since ancient times, rather than a sudden influx of civilization from outside. This does not rule out the fact, however, that this region has seen an almost continuous influx of humanity from outside. These incoming races have enriched the region with their own culture, while they themselves embraced the cultural traits of this part of the world and made it their home.

Such a healthy transaction of cultural traits with other civilizations ushered newer angles of civilization in this region. However, the basic tone of civilization, with its own fundamental traits, seems never to have lost its identity in the sands of time.

A close enough look into the history of the region reveals a fundamentally unchanged DNA underneath the superficial changes that have taken place from time to time. What seems evident from the recent findings from the Harappan civilization is that the 'Aryans' seem not have arrived from some place foreign. It seems more and more evident, on the other hand, that what we know as the 'Aryan civilization' is very much a direct fallout of an indigenous Bronze Age civilization, pre-dated in history. It is this Bronze Age culture that had a natural 'organic' growth into the Iron Age 'Aryan' culture.

This region is vast and developments in culture could not have been uniform in all respects. This would be more so due to the lack of modern communication methods in the olden times. Such a diversity of cultures would have given rise to minor and major conflicts from time to time. However, the underlying basic tone of culture seems to have always held things together and the basic DNA was never completely lost.

The Harappan civilization had extensive use of mathematics, right from design and size of bricks to town-planning. The bricks used by this civilization had a general proportion of 4:2:1, which is

considered favourable for stability of brick-structures. The Mohenjo-daro ruler had a unit length of about 3.4 centimetres or 1.32 inches. It was divided into ten equal parts and all bricks found in this region had dimensions in integral multiples of the unit length. They used a standardized system of weights based on the ratios: 1/20, 1/10, 1/5, 1/2, 1, 2, 5, 10, 20, 50, 100, 200, and 500. The unit weight equaled about 28 grams. This unit length is almost equal to what is known today as one ounce. The mass-production of weights in the shape of regular geometrical figures like cylinders, cones, hexahedra, barrels, etc., required mettle in understanding these conceptual shapes in the first place. Abstract mathematical concepts cannot be extensively used without symbolizing them and a script of some form was a practical necessity of this civilization.

Tectonic science has shown how the gradual drying up of the ancient Sarswati Basin marked an end to the Harappan settlements. The Mahabharata mentions the Sarswati losing its way in the sands before pouring into the sea. Krishna's elder brother, Balaram, goes on a pilgrimage to the place where the river emerges again from the sands. This points towards the decline in the Harappan settlements and the events described in the ancient epic to being almost contemporary.

As the river dried up, there seems to have been a gradual relocation of humanity towards other parts of the subcontinent. As the Saraswati gradually lost its importance the Ganges and other river-systems gained in importance, as people became more and more dependent on these.

The 'Aryans', as they are called were only a title conferred to the more civilized clans of humanity and it included not only the people residing in the Indian subcontinent but also the civilized tribes living in as far as ancient Greece. The Greeks were considered 'Aryan' and were known as the 'Yavans'. A major rebellion against the old established ways of life took place in the form of Buddhism, putting an end to the chaos that prevailed since the era of the demise of the Harappan settlements. A newer and more appropriate way of life for the given era came into being, bringing with it newer developments in arts, crafts and culture. The underlying DNA of the civilization remaining constant.

The more pictorial symbols of an earlier script evolved into a more organized and compact system gradually. Keeping in mind the evolution of the basic traits of the script, as already discussed, a script that belonged to the Harappan era transformed itself into the later day Brahmi over time. The Harappan script holds in its breast secrets uncovering the missing link between the Bronze Age and the Iron Age in the subcontinent. Sites for smelting iron-ore, dating much earlier than previously thought, have been discovered in places in the southern half of the subcontinent, pushing the advent of the Iron Age backwards.

Extensive trade relations with other ancient cultures like the Akkadian and the Sumerian have been discovered. A Sumerian tablet mentions shipment of copper, weighing as much as about 6000 kilograms, from this region.

A better knowledge and understanding regarding the ancient history of the Indian subcontinent means a better understanding of the other related cultures of that time. One other important aspect of this knowledge is understanding the process of transaction of cultural traits between these ancient civilizations. No such civilization would have survived and interacted with each other, without actually imbibing and assimilating the cultural traits of one another. A better understanding of this process will truly enrich the history of humanity, in general.

Discovery of such relations would have huge implications regarding our idea of our own history, as human beings. These recent findings seem to demand of us that the history of the Indian subcontinent and its adjoining regions needs to be revised and rewritten. We should have no qualms about rejecting any age-old idea that is not based upon solid ground and accepting any new idea that

is backed by evidence, new findings and logic. History should not be approached with ideas of dead habits but with true scientific fervor.

Other important linguistic regions , almost neighbouring the Harappan civilization was Akkad and Sumer. These two were situated in ancient Mesopotamia. Akkadian inscriptions begin to appear around 2500 BC and the Akkadian language seems to have been the lingua franca in regions in and around ancient Mesopotamia. The Akkadian inscriptions cover a vast number of subjects that include political happenings, military events, mythology, legal matters, etc. Though these neighbouring mega-cultures shared extensive trade and cultural relations with the Harappan civilization, they were part of a distinctly separate lingual area. Akkadian was the earliest known Semitic language that in its written form used ancient Sumerian cuneiform, though the Sumerian isolate was an unrelated language isolate. By the second millennium BC, we again find two distinct variants of Akkadian emerging in the form of Babylonian and Assyrian. Interestingly, about the same time of the decline of the Harappan culture, the Akkadian culture too bean to wear off, around 800 BCE.

The Akkadian king, Sargon, is said to have extended his empire south to Magan or Oman. Magan finds mention in many of the ancient texts along with Meluhha, as having trade extensive trade relations with the regions around Sumer. Rapid aridification events of the Holocene period, also known as the '4.2 kiloyear BP aridification event' brought about decline of the Akkadian Culture in Mesopotamia and The Old Kingdom in ancient Egypt. The aridification is established to have vastly affected the climate of regions as far off as continental North America. This period of intense aridification started around 2200 BC and brought about a rapid change in human settlement patterns in many regions, including the Nile Basin, Mesopotamia and The Persian Gulf. It also caused a gradual relocation of the Harappan Civilization. A North Atlantic Oscillation may have been one of the major factors triggering the 4.2 kiloyear BP aridification event, which in turn proved to be one of the major factors causing almost synchronous collapse and rapid changes in ancient civilizations.

The Harappan Culture shared many practices of the other Bronze Age cultures. One of these was the extensive use of seals and tablets for various purposes. The Akkadian cities were well-planned, with a good network of roads. Besides trade interactions, these ancient cultures shared cultural relations too. A few civilizations interacting for trade and not being culturally influenced by one another is not a possibility. Discoveries and inventions in all fields of human activities must have been transported from one culture to another, as in today's world, though on a much slower plane. In this way, the Harappan Civilization must have been influenced by other cultures, giving rise to a composite culture here.



Fig. 70 : Various seals and impressions from the Indus Valley



Fig. 71 : Ruins of Dholavira



Fig. 72 : Seal depicting 'yogic' posture



Fig. 73 : Cut-brick, Chanhu daro



Fig. 74 : Figurine from the Harappan culture.

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